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ABSTRACT

The volume represents in microcosm the sort of faculty-trainee-student interaction that is a priority at the Summer Institute of Linguistics (SIL) at the University of North Dakota. Seven studies by faculty and students of SIL include the following: "Lexical Variation in Mexican Sign Language" (J. Albert Bickford); "Reflexives in Veracruz Huastec" (Peter G. Constable); "A Typology of Koine Relative Clauses" (Martin M. Culy); "Switch Reference in Mbya Guarani: A Fair-Weather Phenomenon" (Robert A. Dooley); "The Nahuatl Verb 'maka': A Cognitive Grammar Analysis" (David Tuggy); "Tonal Instability: Tone as Part of the Feature Geometry" (Stephen P. Walker); and "A Morphological Parser for Linguistic Exploration" (David Weber). (MSE)

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SUMMER INSTITUTE OF LINGUISTICS
UNIVERSITY OF NORTH DAKOTA SESSION

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WORK PAPERS

of the

SUMMER INSTITUTE OF LINGUISTICS

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Volume 33

Editors: Robert A. Dooley and J. Albert Bickford

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PREFACE

Of the seven papers in this current volume, four (those of Bickford, Dooley, Tuggy and Weber) represent work by regular SIL-UND faculty members, and three are by advanced students and teaching assistants: the papers by Constable and Culy are essentially chapters extracted from their MA theses at UND completed this year, and the one by Walker is the continuation of work begun in graduate studies at the University of Texas at Austin. In a sense, then, this volume represents in microcosm the sort of faculty-trainee-student interaction that is high on our list of priorities at SIL-UND.

We would like to thank Betty Brown for her conscientious work in copy editing, as well as Bob Wright for invaluable aid in composition on the computer.

R.A.D.

J.A.B.

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LEXICAL VARIATION IN MEXICAN SIGN LANGUAGE

J. Albert Bickford

1 Informal assessments of dialectal variation
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    2.3 Comparison to English
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    3.3 How different is Monterrey?
4 Recommendations about language planning

Mexican Sign Language (MSL) is the primary language used throughout Mexico among a large segment of the deaf population, especially in towns and cities.[1] This study represents a preliminary attempt to determine the amount of dialectal variation in MSL, primarily by means of a comparison of the signs used by nine different sources representing various locations, ages, and social groupings. It is offered in the hopes that it will be of use not only to linguists, but also educators and social service agencies, both in Mexico and the United States of America. There is considerable uncertainty about this matter among professionals who work with the deaf, and many are very interested in more accurate information than is currently available.[2]

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[1] Smith-Stark (1986) provides a very rough estimate that there are approximately 87,000 deaf people who use MSL. More accurate figures are unavailable. Although some deaf people are well-educated and thoroughly bilingual in Spanish (at least reading and writing), a large segment of the MSL population appears to be essentially monolingual. Deaf people generally refer to themselves in Spanish as *sordomudos* 'deaf-mutes' or *silentes* 'silent ones'. There is no standard Spanish name for MSL; some labels in use are El Lenguaje Manual (de México), El Lenguaje de Señas Mexicanas, or simply La Mímica (signing) or "hablar con manos" (speaking with the hands).

[2] Those who are most interested in this information are also those who have contributed much to compiling it. None of this would have been possible without the assistance of numerous people. I hope that I have included a complete list here, but I fear I may have forgotten someone.

Irma Bernal, of the Dirección General de Educación Especial, Hermosillo, Sonora.
Victor Blanco M. of the school of Audición y Lenguaje, Hermosillo, Sonora.
Padre Anival Carvallo and others at the Church of San Hipólito, Mexico City.
Eugene Casad, Martin Culy, John Daly, Kathryn Farris, Barbara Grimes, Bob Goerz, Barbara Hollenbach, Bruce Hollenbach, John Lind, Ron Newberg, and Sharon Stoltzfus, of the Summer Institute of Linguistics.
Helene Cohen, of Pima Community College, Tucson AZ.

Although this study does not come close to covering all of Mexico, or even all social and age groupings in any location, it does give some idea as to the range of variation that is typical. The nature and extent of variation is described informally in section 1, and in section 2 it is shown to be relatively small, at least in terms of its vocabulary. Thus, there is a reasonable probability that MSL is indeed a single language, as discussed in section 3. To be certain, further testing of a different sort will be needed, but for now it seems best to emphasize the similarities within MSL, foster interaction and increased communication between different segments of the deaf community, and avoid actions that would tend to divide it or give the appearance that it is seriously divided linguistically. Specific recommendations along this line are given in section 4.

1 INFORMAL ASSESSMENTS OF DIALECTAL VARIATION

There is considerable confusion as to whether MSL should be considered a single language, a cluster of closely-related languages, or not a language at all. Deaf people themselves, and hearing people who have learned MSL, feel strongly that MSL is a single language, since they have little or no difficulty communicating throughout the country. Although there are differences, they are considered minor and unimportant (with only occasional exceptions). However, when attempts have been made to define exactly what the language is, such as compiling a dictionary or developing materials to teach MSL in the USA, many have reported finding sharp disagreements between deaf people as to the "proper" way to sign. Those who do not know MSL tend to interpret these disagreements as indicating that MSL is not a unified

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Isabel Farha, Esther Marmolejo, Luz Marina Pedraza, Emilia Adame Chavez, Gloria Arango, and others (whose names I unfortunately never learned) at the Dirección General de Educación Especial of the Secretaría de Educación Pública.
Boris Fridman, of the Escuela Nacional de Antropología e Historia, Mexico City.
Peggy Harmon, of the Community Outreach Program for the Deaf, Tucson AZ.
Bob Johnson and Eli Savanick, of Gallaudet University, Washington DC.
Annette Long, of the University of Arizona, Tucson.
Eduardo Montes B. Oca and others at the Instituto Nacional de la Comunicación Humana, Mexico City.
Carol Padden, Patricia Sieglen, and Tom Galey of Deaf Community Services of San Diego.
Thomas Smith-Stark, of the Colegio de México, Mexico City.
Valerie Sutton, of the Center for Sutton Movement Writing.
Karen van Hoek and Ursula Bellugi of the Salk Institute, La Jolla CA.
Eugene and Linda Gehm, Ronald Henson, Donna Jackson Maldonado, Margarita Marquez, and Joseph Mortland.

In addition, there are many deaf Mexicans who provided invaluable practical assistance as well as much of the information in this paper. For the sake of their privacy, I have not acknowledged most of them by name, but my gratitude is no less great even though it is withheld from public view. My friends, thank you!

Anyone with further questions or information on this subject is encouraged to contact me at Box 8987 CRB, Tucson AZ 85738, USA, (602) 825-1229 during August-May, and at Box 8217 University Station, Grand Forks ND 58202, USA during June and July.

language. They are tempted to think of it as a helter-skelter collection of dialects, and some even question whether it is a language at all.

This difference of opinion has been noted especially by Parra and Parra (1986:iii) and by staff members at Deaf Community Services of San Diego (personal communication). I have also observed it directly in my discussions with people in and out of Mexico; deaf people feel strongly that MSL is one language, while educators and service providers are bewildered by the differences and disagreements they find.

There is no question that there are differences between signers. At least for a linguist, this is not surprising either. Dialectal and individual variation is normal in spoken languages; there is no reason to think it would be any different for signed languages. The only significant question is whether there is enough variation to classify the different dialects as belonging to the same or separate languages.

Further, just because complete uniformity is not readily apparent does not mean that there is no language at all or only a primitive one; the existence and maturity of a language can only be judged by a careful linguistic investigation, which to this point has not been undertaken. However, Jackson Maldonado (1981) has demonstrated that MSL has all the characteristics that linguists have come to expect of spoken languages. Bob Johnson (personal communication) reports that, based on brief contacts with signers in Mérida, Yucatán, he observed several structural characteristics which also normally occur in other mature sign languages (as opposed to home sign systems or signed versions of spoken languages). Boris Fridman (personal communication) has found considerable structural regularity in the basic elements used to construct signs (analogous to the sounds of an oral language). My own observations of deaf people in Mexico and the way they relate to each other in large groups also leaves me with no doubt that MSL is a genuine, well-established linguistic system; the extent of interaction I observed would not be possible if it were not. And, the data in this study also demonstrates that there is a large core of basic vocabulary that is in use, with only minor variations, by all the sources I consulted.

Therefore, we need not consider further whether MSL is a real language, or whether there is dialectal variation. Instead, the important questions that must be addressed include the following:

1. How much variation is there from one dialect of MSL to the other?
2. Is it great enough to consider them to be different languages, or just different dialects of the same language?
3. What sociological factors are important in defining dialect boundaries?

I address the first two questions, at least from the point of view of the lexicon (i.e. the vocabulary of signs used in MSL), in section 2. For the moment, I turn to the third.

Only a much more extensive study would be able to define dialect boundaries precisely. However, based on informal observations made by signers and others in close contact with the deaf community, it seems that the major factors defining dialect boundaries are location, age, and religion.

One man in Mexico City, about 60 years old, noted that he often has trouble communicating with people in their teens and early twenties. Conversations were possible only if both people were willing to make an effort to communicate. His hearing son, who is in his mid-twenties and also knows MSL, reports the same problems; he can only communicate well with his father's friends. The father also noted that there were smaller differences between his generation and signers in their 20s, 30s, and 40s. He attributed this to the fact that in recent years deaf people have not had the opportunity to receive an education in MSL. Oralism has been the dominant philosophy in deaf education in Mexico since the Escuela Nacional de Sordomudos (National School for the Deaf) was closed.[3] He felt there were greater differences within Mexico City than between him and other places in the Republic; elsewhere even the younger people have apparently retained the more traditional dialect that was taught in the Escuela Nacional. He normally has no trouble communicating outside Mexico City; however he did admit that he had trouble following conversations that he was not participating in ("They sign too fast.")

Joseph Mortland (personal communication) distinguishes the same three dialects in Mexico City according to age: the traditional signing of people in their 40s and above, the somewhat more innovative signing of young adults, and a "street slang" which is used mostly by teenagers and is especially distinguished by its greater use of profanity.

Eugene and Linda Gehm (personal communication) report that there were differences, at least in theological terminology, between the Baptist congregation in Mexico City and the Catholic community associated with the Church of San Hipólito.[4] In many cases these signs are obviously derived from basic theological disagreements between the groups. For example, the Catholic sign for "baptize" is based on pouring water on a person's head, while the Baptist word is based on immersion.[5]

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[3] I have not been able to determine the exact date when the school closed. The source here claimed it was 1952 or 1953; Smith-Stark (1986) however reports a source who gave a date ten years later.

[4] The Baptist church is located at 51 Miguel Alemán, between Cardenas and Dr. Vertiz, in Mexico City (near Metro Cárdenas). Mortland founded this church, but has since turned the leadership of it over to a deaf Mexican pastor. Approximately 50 people, all deaf, were in attendance the day I visited.

The Catholic church of San Hipólito is located at the corner of Hidalgo and Reforma near downtown Mexico City and the Alameda, at Metro Hidalgo. One mass each week is interpreted in MSL for the deaf parishioners.

To some extent, age and religious boundaries may reinforce each other. Although there are some younger people in attendance at San Hipólito, most of the approximately 200 people who attend mass and Sunday School there are middle aged or older. The Baptist congregation, on the other hand, consists entirely of young families and singles in their twenties. There used to be some older members, but they withdrew recently to begin a new congregation. Teenagers seem to have relatively little interest in either congregation. This is evidenced by Mortland's mention of profanity in connection with the teenage dialect, and by a complaint by one of the members at San Hipólito that many of the people who congregate outside the church on Sunday morning do not attend mass; there were significantly more teens and young adults in this group than there were inside the church.

One final set of facts needs to be reported, although they are difficult to interpret. Smith-Stark (1986) and Parra and Parra (1987) note that there was a five-minute daily news broadcast in MSL over XEW television (channel 2) in Mexico City. However, several deaf people reported to me that they could not understand it. This may have been due to dialectal differences or to the content of the broadcast, which was probably unfamiliar to many in the deaf community because of their minimal educational opportunities (Smith-Stark, personal communication). The program went off the air in 1988, although XEW has continued to broadcast occasional programs about deaf people which try to promote understanding about MSL to the hearing population, and programs with interpretation in MSL.

2 LEXICAL COMPARISON

As helpful as they may be for general orientation to the problem, informal assessments of dialectal variation are often difficult to interpret, and do not give precise results. For this reason, I gathered data to make a detailed comparison of the signs used in different dialects. This technique of collecting wordlists is generally the first step in a survey of dialect variation, since it can be done with relatively little effort compared to other methods, and is usually necessary before other methods can be applied.

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[5] As Bob Dooley has pointed out, the two words for "baptize" are probably better analyzed as having different meanings, although they have the same Spanish translation. Each group's word for "baptize" reflects its own religious practices. It is not known if all dialect differences based on religious preference are of this nature, or what words are used by people with no particular religious affiliation. Even if they are, the practical result is the same; the two groups would have difficulty using the same written or videotaped materials if such words needed to be used.

2.1 Sources and methodology

The sources of my data for lexical comparison were of two types: wordlists obtained directly from native signers, and published dictionaries.

Standard wordlists are normally used to help establish whether two dialects represent the same or different languages. The most famous are those compiled by Morris Swadesh (1950, 1954, 1955). These lists, designed for spoken languages, are inadequate for sign language research, since they contain a great deal of vocabulary that is highly motivated semantically, i.e. it is easily pictured on the hands. Pronouns and body parts, which often make up a large part of such lists, are especially problematic in this regard, since in most sign languages these words are produced simply by pointing. If two forms of signing have the same sign for such words, this tells us nothing about whether they are the same language. I therefore compiled my own wordlist (see the appendix), which omits pronouns, body parts, and other problematic words, and includes more abstract terminology than would normally be used in a dialect survey of spoken languages.

Using this list of approximately 100 words, data was collected from five different sources: two in Hermosillo (Sonora), another in Cuernavaca (1 hour south of Mexico City), and two in Mexico City itself. Spanish words were presented in writing to one or more deaf persons, who then demonstrated the corresponding sign. Each sign was transcribed phonetically, using a writing system based on one being developed for American Sign Language (ASL) by The Center for Sutton Movement Writing.[6] Some minor modifications and extensions to the Sutton system were necessary because of differences between ASL and MSL.

In Hermosillo, 66 words were collected from a group of three people, one man and two women, in their early twenties. As they did not have time to work with me further, the rest of the words were collected from the novio (i.e. boyfriend or fiance) of one of the women. Since he was originally from Mexico City, I have distinguished the two sources as HMO (native Hermosillo) and H/MX (Hermosillo with background in Mexico City). Religious affiliation is unknown, but probably unimportant, as there are apparently no deaf churches in Hermosillo (Irma Bernal, personal communication).

In Cuernavaca, my source was a woman, approximately 30 years old, a Catholic from a hearing family, whose husband is a recent Protestant convert.

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[6] An early version of this writing system is used in public schools in Denmark, and efforts are under way to refine it so that it represents only those linguistic details necessary for communication. A quarterly newspaper in ASL and English was previously published using it, and publication has just been resumed. Software is available for producing this script on Apple II, MacIntosh, and IBM PC compatible computers. The address for the Center for Sutton Movement Writing is PO Box 517, La Jolla CA 92038-0517, USA.

In Mexico City, one source was a man, approximately 60 years old, religious affiliation unknown. The other was a man, approximately 30 years old, and a prominent leader in the Baptist church.

In addition, four published dictionaries were available.[7] All four transcribe signs using drawings, and provide a brief gloss in Spanish. The words in the wordlist were sought in each dictionary, and the drawings were retranscribed using the same phonetic system as the wordlists. Not all words were available in every dictionary, of course; the exact number available in each is reported in the bottom row of Table 1.

Two volumes entitled *Mis Primeras Señas* and *Mis Primeras Señas - 2*, produced by the Dirección General de Educación Especial of the Secretaría de Educación Pública (Directorate of Special Education of the Federal Department of Public Education), are apparently the only published lexical materials that were compiled with the assistance of trained linguists (Donna Jackson Maldonado and Boris Fridman). As there is virtually no overlap in the material in the two volumes, and they are based on the same group of signers, I treat them here as one source, abbreviated MPS. MPS appears to reflect primarily the signing of the older generation, particularly Gustavo Couret and Leonardo Arroche (who are listed as collaborators). Occasionally it lists more than one sign for a given Spanish gloss, something that does not occur in the other sources, reflecting a greater sensitivity to and acceptance of dialect variation. A brief description of the sign, noting handshape, orientation, point of articulation, etc., is also included to clarify the drawings. Together, the two volumes include approximately 500 signs.

Parra and Parra 1986 (PP) includes American Sign Language and English as well as MSL and Spanish, and is offered as an aid in bridging the gap which separates the four languages. The data was collected from various parts of the Republic; where regional differences exist, PP generally gives the most common variant. Brief descriptions of each sign are also included, like those provided by MPS. PP includes approximately 700 signs.

Henson 1983 (HEN) reflects primarily the signing in Monterrey (Ronald Henson, personal communication). It gives diagrams (without descriptions), and Spanish and English glosses. HEN includes more signs than any other source, approximately 1500.

Luna Guzmán and Miranda 1987 (LGM) is the only source compiled entirely by deaf people. It includes diagrams (without descriptions) and Spanish glosses. As the authors have some connection with the deaf community at the Church of San Hipólito, one could assume tentatively that the book reflects the signing of that community, although this is not certain. LGM includes approximately 1300 signs.

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[7] Joseph Mortland (personal communication) reports that a fifth dictionary is due to be published by the Confederación Nacional Deportivo, Cultural, y Recreativo de Silentes de México (Mexican National Deaf Federation for Sports, Culture, and Recreation).

Once the entire wordlist, or as much of it as possible, had been converted to a common writing system, counts were made of the number of similar and identical signs in common between each pair of dialects.

Signs were scored as being similar if they appeared to be cognate. Usually this meant that they differed in only one or two features (handshape and/or orientation, type or location of movement, point of contact, etc). However, a systematic tabulation of regular correspondences was not undertaken; this would be necessary to determine if two forms actually were cognate or just similar by coincidence or borrowing.

Deciding whether two signs were identical was more difficult. One problem was posed by inadequacies of the transcriptions, either due to my mistakes, or difficulties in interpreting diagrams in the dictionaries. Details that were frequently unclear included the following:

Number of repetitions of a movement
Exact path of a movement
Direction of rotation for circular movements
Force, speed, and length of movement
Presence of special facial expressions

In general, I assumed that signs from two sources were identical if the transcription was not clear enough to distinguish them.

Another problem was posed by free variation (minor differences in a sign that make no difference in meaning). Some features that varied freely for a given speaker include the following:

Position of the thumb (extended, alongside other fingers, or tucked into the palm) for many handshapes
Tightness of the fist
Interchanging of left and right hands for ambidextrous signers
Number of repetitions of a movement
Minor differences in hand orientation

Such differences were discounted in determining whether two signs were identical, under the assumption that presence of free variation in preliminary transcriptions tells more about the analyst and what he happens to notice than about the language.

Other features seemed to vary considerably from one speaker to the next, including all the above, plus the following:

Whether terms for males and females were distinguished using the feminine suffix (Parra and Parra 1986:xix, Mis Primera Señas 1983: 24-25)

Differences in the left handshape

Again, these differences were discounted, assuming that they would be widely known throughout a signing community, essentially individual (as opposed to dialectal) in nature, and normally irrelevant to communication.

The attempt here was to approximate what signers themselves would recognize as being "identical" signs, i.e. pronounced alike in all respects that they would notice. In this attempt I may have artificially raised the percentages of identical signs; this should be borne in mind when interpreting the results. Nevertheless, this is not a great problem in comparing these results to other studies, since lexical similarity is much more commonly reported than lexical identity, and since I later calibrated the results by using the same method to measure lexical identity in English (see section 2.3).

Finally, asking for signs using Spanish occasionally created some confusions. For example, in response to sí 'yes', some people provided the sign that means si 'if'. Where I could clearly establish that confusion had arisen between two distinct signs with similar Spanish glosses, I scored each sign as a different word. When one source of a pair gave one sign, and the other gave a different one, I treated this as if one or both sources did not provide a sign, i.e. no comparison could be made. Finally, when a Spanish word seemed to have no good MSL equivalent, indicated by confusion and uncertainty by more than one signer, that word was eliminated from the list for all sources.

2.2 Results

The number of words available for comparison between each pair of dialects is given in Table 1. The abbreviations used are as follows:

Dictionaries:

MPS	Mis Primeras Señas, Mis Primeras Señas 2
PP	Parra and Parra 1986
HEN	Henson 1983
LGM	Luna Guzmán and Miranda 1987

Signers:

HMO	native Hermosillo
H/MX	Hermosillo, with background in Mexico City
CUE	Cuernavaca
MXO	Older signer from Mexico City
MXY	Younger signer from Mexico City

The main, triangular portion of the table shows figures for pairs of dialects, indicating the number of words that were available for comparison for each pair. The total number of words available from each source individually is given as the last line in the table. For example, 53 words were available in MPS, of which 47 were also found in PP, 48 in HEN, 45 in LGM, etc.

TABLE 1: Words available for comparison between each pair of MSL sources, and total number of words available from each source

MPS	--								
PP	47	--							
HEN	48	64	--						
LGM	45	59	80	--					
HMO	37	46	58	57	--				
H/MX	16	24	31	30	--	--			
CUE	52	66	87	83	61	31	--		
MXO	52	67	90	86	63	33	94	--	
MXY	52	69	90	87	65	33	92	96	--
	MPS	PP	HEN	LGM	HMO	H/MX	CUE	MXO	MXY
Total	53	69	91	88	66	35	94	98	99

Table 1 is provided so the validity of later statistics can be evaluated. The more words available for comparison, the more likely the later statistics are accurate representations of the language as a whole. In most cases, at least 50 words were available for comparison between any two sources. It would have been much better to have 100 words available for any pair of dialects, but this was not possible given that many of the sources were published dictionaries, each of which included a different sampling of the vocabulary of the language. Further, because of having to use two different sources in Hermosillo (HMO and H/MX), neither of these sources includes the entire 100 words.

Table 2 lists the percentages of lexical similarity for each pair of sources. The bottom line of the table lists the average percentage of similarity of each source with all other sources.

TABLE 2: Percentage of lexical similarity between each pair of MSL sources, and average percentage of similarity of each source with all other sources

MPS	--								
PP	98	--							
HEN	94	95	--						
LGM	96	95	92	--					
HMO	97	96	93	91	--				
H/MX	100	100	94	97	--	--			
CUE	96	94	94	92	97	90	--		
MXO	90	94	91	87	94	85	94	--	
MXY	98	97	97	94	95	97	97	92	--
	MPS	PP	HEN	LGM	HMO	H/MX	CUE	MXO	MXY
AVG	96	96	94	93	95	95	94	91	96

Except in two cases, all percentages are above 90%. The two exceptions both involve the same signer, MXO, who also has the lowest average similarity with other sources. He was also the only older signer I consulted, and was older than the sources MPS used. This tends to reinforce the hypothesis that age is a significant factor in dialect variation.

Still, the percentages here are all extremely high. Swadesh (1950) suggests using 85% as the minimum amount of lexical similarity required for classifying two dialects as subdialects of the same language.[8] Among the various Romance languages, lexical similarity ranges between 70% and 90% (Rea 1958). Even though the number of words available for comparison in MSL is less than ideal, the consistency with which lexical similarity is above 90% suggests strongly that the different sources are subdialects of the same language, rather than separate languages. (However, lexical similarity is not a guarantee of intelligibility, i.e. the ability of one dialect to understand another; this matter is discussed in more detail in section 3.3.)

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[8] To be more precise, Swadesh (1950:163) adopts the criterion that two dialects with a time depth of 0.5 units or less be considered to be part of the same language. According to the formula he used to calculate time depths, this translates to 85% cognates, which I am here equating to lexical similarity (even though cognate counts are somewhat more precise than lexical similarity counts based only on inspection).

On the other hand, there is a significant amount of minor variation between sources, as shown in the measures of lexical identity in Table 3. When exact details become important in the comparison, rather than just the major outlines of the sign, percentages drop to between 50% and 85%. (The one case of 94% identity between H/MX and MPS should probably be ignored, since only 16 words were available for comparison in this case.)

TABLE 3: Percentage of lexical identity between each pair of MSL sources, and average percentage of identity of each source with all other sources

MPS	--								
PP	79	--							
HEN	67	63	--						
LGM	76	66	54	--					
HMO	81	70	60	60	--				
H/MX	94	83	61	70	--	--			
CUE	85	74	57	61	75	74	--		
MXO	71	69	57	58	65	70	69	--	
MXY	83	80	61	68	78	82	80	72	--
	MPS	PP	HEN	LGM	HMO	H/MX	CUE	MXO	MXY
AVG	80	73	60	64	70	76	72	66	76

Although it is not known to what extent these differences would interfere with intelligibility, they probably do not, as they are comparable to what can be found in a diversified English-speaking community, as shown in section 2.3. Further, Bob Johnson (personal communication) reports that the deaf people he knows exhibit a comparable amount of variation in vocabulary and pronunciation, and use it playfully in conversations; only rarely do differences like this interfere with communication, and then only minimally.

Taken together, Tables 2 and 3 indicate that the variation to be found in MSL is not primarily due to differences in vocabulary, since (as Table 2 shows) essentially the same words are used by all sources. What does vary is the exact manner in which those words are pronounced. That is, most variation in MSL appears to be phonological in nature, not lexical.

This means that Table 3, which measures phonological variation, gives a better idea than Table 2 of the relative linguistic distance of each source from the other sources. As in Table 2, MXO is one of the most divergent. HEN and LGM are also quite divergent; these are discussed later. On the other end of the scale, MPS apparently has more in common with other sources than any other source, possibly reflecting an attempt on the part of its compilers to provide a representative sampling of signs usable in schools throughout the Republic. Similarly, PP has much in common with other dialects, probably due to their use of the most common sign where there were dialectal variations. The other "central" dialect, H/MX, is that of a merchant who has travelled considerably within Mexico. However, before assuming that these sources somehow represent "standard" forms of the language, note that the number of signs available for comparison in each (Table 1) is relatively low; the high lexical identity figures in Table 3 may have arisen because words that vary frequently from one dialect to another were not available for comparison (either by chance, by deliberate selection on the part of the authors of MPS and PP, and/or by the fact that only 35 words were obtained from H/MX).

2.3 Comparison to English

In order to have a further basis for interpreting the lexical similarity and identity scores for MSL, I used the same methodology to survey English. The purpose was to provide a standard of comparison against which to judge the results of the MSL survey. In particular, since wordlist data collected by someone who doesn't know the language is subject to many types of error, I wanted to discover what results might be typical when it was impossible to sort out these errors, as is normally the case in surveys of little-studied languages. Therefore, I approached a survey of English dialects as much as possible in the same way I approached the MSL survey.

The same 100 words were gathered from four native English speakers, from Minnesota, Nebraska, northern Georgia, and central California. All could communicate with each other with no difficulty, and there was no question that they shared the same language (although they showed considerable dialectal variation, i.e. they had noticeably different accents).

The same wordlist was used as with MSL; words were presented in Spanish and the speaker was asked to provide the corresponding English word. Their fluency in Spanish was minimal to moderate, approximately the same ability in Spanish as the sources of MSL data.

Data was scored using the same principles that I used for MSL. Apparent cognates were scored as similar, in virtually all cases these are items that native speakers of English would identify as being variant pronunciations of the same word. In order to accurately simulate the types of error that may have occurred in surveying MSL, I avoided using knowledge that I possessed about English. For example, I scored two items as dissimilar even when I knew them to be synonyms, and even though all speakers in the study would understand both. I scored two items as nonidentical if they were pronounced differently, even though I knew that they were alternative pronunciations of the same word. However, I did discount certain differences that I knew I had not transcribed with consistent accuracy (such as vowel length, and voicing of stops at the beginnings and ends of words), and minor differences in vowel quality; this is analogous to the phonetic details that I ignored in the MSL survey.

The total number of words available for comparison between each pair of languages is shown in Table 4; this corresponds to Table 1 for MSL. The percentages of lexical similarity and identity are shown in Tables 5 and 6; these correspond to Tables 2 and 3.

TABLE 4: Words available for comparison between each pair of English sources, and total number of words available from each source

MN	--			
NB	98	--		
GA	98	99	--	
CA	97	98	97	--
	MN	NB	GA	CA
Total	99	100	100	98

TABLE 5: Percentage of lexical similarity between each pair of English sources, and average percentage of similarity of each source with all other sources

MN	--			
NB	96	--		
GA	94	94	--	
CA	91	95	93	--
	MN	NB	GA	CA
AVG	94	95	94	93

TABLE 6: Percentage of lexical identity between each pair of English sources, and average percentage of identity of each source with all other sources

MN	--			
NB	67	--		
GA	57	61	--	
CA	66	56	49	--
	MN	NB	GA	CA
AVG	63	61	56	57

Note that the results are approximately what we would expect, based on informal assessments of the dialect differences. Lexical similarity (Table 5) is all above 90%, in accordance with standard assumptions that lexical similarity is above 80-85% between two dialects of the same language. Lexical identity is quite a bit lower, as expected. However, it is somewhat surprising that lexical identity between MN and NB was only 67%, since these are both classified as midwestern dialects. Nevertheless, MN and NB are closer to each other than to other dialects, and each has more in common (on the average) with the other three dialects than GA and CA do. These facts show that the survey method used has at least a certain amount of validity.

Still, it was clear in scoring the English that the results of this type of survey should not be relied on as if they gave direct information about dialect variation. Rather, they give an approximate measure which is subject to various types of error. For example, when two people provide dissimilar words, there is no easy way in a preliminary survey to determine whether the two words are synonyms (recognized and used by both people) or genuine dialectal differences. When words from different speakers are similar but not identical, there is no way to determine whether the differences would interfere with intelligibility. (Many of the differences contributing to the low identity score of MN and NB were of this type.) And, there are always errors in transcription, misunderstandings as to what word is expected, etc., that arise because the linguist does not know the language well enough to avoid them.

Assuming that the errors in surveying English approximated those that certainly existed in surveying MSL, we can now compare the results of the MSL survey to the English survey to see if the method used provides any evidence about whether MSL is one language or a cluster of closely related languages. Lexical similarity of the different MSL sources is for the most part the same as the four English sources. Lexical identity scores for English are somewhat lower than those for MSL. Thus, based on the results of this study, MSL appears to be more uniform than English in vocabulary and pronunciation.

3 INTERPRETING THE RESULTS

In this section, I discuss the above results, addressing three issues:

How severe are the dialect differences? Is MSL one language or many?
How reliable are the current results, and what further testing is needed?
What is different about the Monterrey dialect, and how different is it?

3.1 One language or many?

The majority of the evidence available favors the conclusion that MSL is one language, at least for the signers and dictionaries sampled in this study. The variations in word choice (lexical similarity) and actual pronunciation (lexical identity) appear to be less than what can be found in an English speaking community with a moderate amount of dialectal variation. Differences of this degree pose no barrier to effective communication in English, and there is no reason to think they would pose a barrier in MSL. The reports of people who know MSL also support the conclusion that MSL is one language. Although there are some indications that dialectal differences may be more important than the present study suggests, there is currently no strong evidence for considering MSL to be anything more than a single language.

Of course, such evidence may turn up later. Only a small number of the possible dialects of MSL were sampled. The amount of error due to my minimal knowledge about MSL and the particular survey techniques I used may have skewed the results towards showing less (or more) variation than actually exists. And, two dialects could conceivably have relatively high lexical similarity, but due to differences in grammar, may not be intelligible. These factors should be kept in mind when interpreting the results reported here.

Despite these possible problems, this study provides the best information currently available about dialectal variation in MSL. In light of it, how are we to understand the informal reports about whether MSL is or is not a single language? Recall that those who know MSL tend to regard it as a single, unified language, while those who do not know it tend to disagree, being acutely aware of all the variation they have seen in it. The truth about the language probably lies somewhere between these two extremes.

On the one hand, there is some possibility that the differences may be greater than signers realize. Face-to-face communication provides opportunities for bridging language barriers that are outside the language itself. This is especially true in sign languages, which can easily use mime and mime-like gestures in place of established vocabulary, and there is almost always the opportunity to finger-spell a word to explain the meaning of a sign. Further, if a word is not understood, clarification can be sought immediately, and misunderstandings cleared up. Such opportunities would not exist if the message was videotaped, for example, or if a person was watching a conversation that he was not actively participating in. As noted above, there are informal reports of difficulties in understanding in precisely these situations. It is conceivably possible that two people might not be able to understand each other's dialect of MSL, but still be able to communicate well, by taking advantage of those parts of the language they have in common, along with other techniques that are outside the language.

Thus, the problem with informal reports about ability to communicate is that they do not adequately separate actual linguistic intelligibility from the general ability to communicate. Yet, it is intelligibility, not ability to communicate in spite of linguistic differences, which is important for determining whether two varieties of signing are one language or two. And, it is intelligibility which must be used for making decisions about how written and videotaped materials should be prepared, since there is no opportunity for the listener to ask for clarifications from a videotape or a book.

On the other hand, there is apparently a strong tendency for outsiders, especially hearing people, to overreact to the disagreements they see about the "proper" way to sign. Until a person has studied dialect variation closely, one doesn't normally realize that variation to the extent found here for MSL and English is normal. There is no reason why MSL must have just one sign for any given Spanish word, and there is no reason why everyone needs to sign every word exactly the same way. As long as everyone recognizes all the different signs in use in a linguistic community, they can be said to share a common language. The lexical comparisons suggest that most of the arguments that have taken place have been about relatively minor matters, and do not reflect a lack of a common language. After all, people couldn't have had such violent arguments if they didn't have a common language to disagree in!

All in all, the lexical data support the view of signers that MSL is a single language more than they do the view of non-signers. And, since signers know more about their language than non-signers, it seems wise to weigh their judgment more heavily. Despite some possible areas of nonintelligibility that need to be investigated, the best course at present would be to consider MSL as one language.

3.2 Need for intelligibility testing

There are many methods that have been proposed for determining whether two forms of speech represent separate languages or simply subdialects within the same language. B. Grimes (1988) reviews a great number of them, and argues strongly that the only really adequate method is intelligibility testing such as that described by Casad (1974). In intelligibility testing, tapes recorded in one dialect are played for speakers in another dialect. Simple questions are asked about the contents of the tape, and based on the accuracy of the responses, percentages of intelligibility between the dialects are computed. Such testing has been extremely valuable, for example, in identifying the dialects of the indigenous spoken languages of Mexico (Egland, Bartholomew, and Cruz Ramos 1983). The advantage of this method is that it provides a direct measure of the ability to communicate using a language, which intuitively should be the most important criterion in deciding if two dialects are part of the same language.

The correlation between intelligibility testing and lexical similarity scores (like those reported in Tables 2 and 5) is not very high. Among languages with 80% lexical similarity, for example, intelligibility scores ranging between 30% and 79% have been reported. The reason for this variation is that intelligibility is dependent on more factors than just shared vocabulary; systematic differences in pronunciation or grammar can interfere with intelligibility even when lexical similarity is high.[9]

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[9] Lexical similarity is a good predictor of intelligibility only when it is low; in this case intelligibility is also low (J. Grimes 1988).

B. Grimes (1988) argues that since ultimately the ability to communicate (intelligibility) is what is important, and since lexical similarity tests at best provide only approximate measures of intelligibility, decisions about whether two dialects represent separate languages or just subdialects of the same language should not be made until after intelligibility testing is done. And, as we have seen above, there is a possibility that face-to-face encounters may hide difficulties in understanding other dialects; again intelligibility testing, using videotaped materials, would separate linguistic intelligibility from general ability to communicate.

Therefore, the conclusions reported in this study should be regarded as only tentative and preliminary. Although both the high lexical similarity figures and the informal reports of deaf people indicate that MSL is most likely a single unified language, intelligibility testing is needed to settle the matter firmly. This information is particularly important for making decisions about which dialect or dialects to use in written, televised, or videotaped materials.

3.3 How different is Monterrey?

Because of the high visibility of the Monterrey dialect (due to the publication of Henson's dictionary), it is important to discuss it in detail. Further, the figures reported here for lexical similarity between Monterrey and Mexico City are higher than the one reported by Smith-Stark (1986). Based on data gathered from Leonardo Arroche (one of the primary contributors to MPS) and compared to HEN, he found 80% apparent cognates. The comparable figures in the present study, in Table 2, are in the range of 91-97%, with the similarity of HEN and MPS at 94%.

It is hard to know how to account for this difference. One possible explanation is that Smith-Stark's sample size was somewhat larger; he had 142 pairs available for comparison, compared to my 98. To be sure if the smaller sample size that I had available has skewed my results, a sample of perhaps 200-500 words should be compared.

Another possible explanation is that Smith-Stark may have been stricter than I in classifying a pair of words as "similar"; in general he scored two signs as similar only if they demonstrated "identidad o semejanzas fuertes en por lo menos dos de los tres aspectos principales de la formación de las señas: conformación de las manos, lugar, y movimiento" ("identity or strong similarities in at least two of the three principal aspects of sign formation: handshape, place, and movement"). It may be that I was more lenient than this.

A third possibility is that his sample included many signs with a high amount of semantic motivation. When he eliminated such signs, comparing only those 43 pairs that were more arbitrary, the percentage of similarity rose to 88%. This figure is much closer to mine, and indeed this latter method may be more comparable to the one I used, since I started from a list that had already eliminated words likely to have high semantic motivation.[10]

Henson (personal communication) has no trouble communicating with people elsewhere in the country, suggesting that whatever differences may exist between Monterrey and the rest of the country are mostly a matter of aesthetics, and not barriers to communication. The present study tends to reinforce this view; the differences between HEN and other sources are no greater than many differences which can be found within Mexico City itself, particularly those involving LGM and/or HMO. Interestingly, too, MXY (who prefers LGM to HEN) actually has about the same lexical similarity with both sources. Although his percentage of lexical identity with LGM is slightly greater than with HEN, both are low compared to his scores on other sources.

We cannot at this time say whether the differences in Monterrey are great enough to classify it as a separate language. The discrepancies between informal reports, Smith-Stark's study, and Table 2 further point out the need for a more precise method of measuring dialectal variation, such as intelligibility testing.

The other difficulty with Monterrey is interpreting the explanations offered by signers in Mexico City for the differences in HEN. Smith-Stark (personal communication) reports that some signers attribute them to influence from ASL on MSL of Monterrey. Yet he found no greater similarity of ASL to Monterrey than to Mexico City. Joseph Mortland (personal communication) reports that other signers believe Henson, a hearing North American missionary, gathered most of his data from a hearing deaf educator that they claim is not in close contact with the deaf community (although she has five deaf siblings). They explain the differences in HEN as inventions by her or Henson. Yet, Henson reports that he relied on her help only in initial stages, and gathered most of his data directly from deaf people. In other words, it is difficult to understand how the explanations mentioned here about HEN could be correct.

One fact in Table 3 sheds light on this issue. This is the average lexical identity of each source with all other sources; HEN scores lower than all other sources on this measure, just below LGM and MXO. On the other hand, the comparable figures for lexical similarity (Table 2) show HEN to be about the same as other dialects. This shows that although Monterrey (like other dialects) does not have much unique vocabulary, there are many minor differences between it and other dialects. This, in turn, further reinforces the conclusion that the differences in Monterrey are not due to borrowing from ASL or inventions by hearing people. Rather, they are more like the regular differences in pronunciation between different dialects of Spanish.[11] At any rate, until this issue can be investigated further, it seems best to assume that HEN's reports about the signs used by the deaf in Monterrey are accurate.

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[10] It is a mystery why lexical similarity should increase when semantic motivation is diminished. Perhaps it is because greater lexical variation can be tolerated when a sign has an obvious meaning. When the meaning is less obvious, more demand is placed on pure memory without anemonic aids, and it is more important that everyone use the same sign if communication is to proceed smoothly.

Although attempts by native speakers to explain the differences between Monterrey and Mexico City do not appear to be correct, they do suggest that Henson's dictionary is not well accepted in Mexico City, and that outlying dialects like Monterrey may have lower prestige, at least in the eyes of people in Mexico City. Prestige factors like this need to be investigated more thoroughly before attempts are made to describe any "standard" form of MSL, prepare materials for teaching, or develop literature (either written or videotaped).

4 RECOMMENDATIONS ABOUT LANGUAGE PLANNING

The impetus behind this study has come from linguists, educators, missionaries, and social service agencies who need to know about MSL's status in order to conduct their professional activities. Their concerns have included the following, all of which can be considered part of "language planning":

> Where should programs of linguistic research be conducted in MSL, and how many distinct programs will be necessary?
>
> How can deaf people achieve their desire to have increased public and governmental support for deaf services, and especially increased acceptance of MSL as an important language of the Republic?
>
> Assuming that support for teaching MSL to deaf children can be obtained, what form of MSL should be taught? Is there a standard form which could be promoted throughout the entire country? Should there be any attempt to make MSL more like Spanish, under the assumption that this will facilitate the learning of Spanish?
>
> What form of MSL is most useful for communication throughout the Republic? Is there a standard dialect which can be used for television broadcasts, videotapes, and perhaps even written materials (providing a suitable writing system could be developed)?
>
> How can deaf service agencies best meet the needs of deaf Mexicans in the USA?

In this final section, I would like to suggest ways of answering some of these questions.

There are two proposals commonly made for sign languages which seldom work as well as their proponents would like. One is to promote a type of sign language that follows closely the grammar of the dominant oral language. The other is to pick one form of the language as standard, and try to promote it above all others.

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[11] E.g., 'z' is pronounced 's' in Mexico but like English 'th' in Spain.

The general problem with these two approaches is that it is extremely difficult, if not impossible, to promote change in a linguistic community by means of education or legislation. Educators and government officials don't have enough influence to be able to change linguistic habits that are well entrenched; people are going to go on speaking or signing the way that is most comfortable, because almost everyone is primarily concerned with communicating information, and cares very little about following some sort of "standard". If people get their point across, that is sufficient. Efforts of educators and legislators in many languages over hundreds of years have done little to change this situation. This is especially true when the efforts to change the language proceed from outside the linguistic community, as would be the case with MSL.

There are special problems when signed versions of spoken languages are invented. These forms of signed communication use the grammar of some spoken language combined with vocabulary drawn from a sign language, inventing signs when there are no direct equivalents for a particular word in the spoken language. There is a fair amount of evidence that such systems are awkward, unnatural, and not very useful as communicative tools. Due to this awkwardness, they quickly evolve into something much more flexible and useful. Klima and Bellugi (1979) document such changes in the history of American Sign Language (and earlier in Old French sign language). This has resulted in major differences between ASL and MSL, even though they are both descended from Old French Sign Language only a century ago (Smith-Stark 1986). Rapid change such as this can be attributed to the instability of signed versions of spoken languages. Johnson, Lidell, and Erting (1989:8-9) cite work by S. Supalla (1986) which demonstrated that even in an ideal environment for learning Signed English, deaf children did not sign in the same way as their adult models. They point out (p. 5) that signed versions of spoken languages are not natural languages, in that they do not develop naturally in a community of language users, they are taught in schools rather than being acquired by a child in the normal context of everyday life, and what grammatical organization they have is entirely dependent on another language rather than being derived from their own internal dynamic. Deaf people almost always prefer a pure sign language, rather than a signed spoken language, when they are communicating among themselves. All this suggests that any attempt to invent such unnatural languages is doomed to fail, because they cannot and will not be transmitted naturally.

The worst part of introducing a signed spoken language is that it does not improve the linguistic situation, but complicates it, by placing two signing systems in competition with each other. Children trained in the newer system may not be able to communicate with older deaf people, due to the differences in syntax (and often vocabulary) between the two signing systems. Children who attempt to acquire it will change it to make it more natural, and different schools may change it in different ways, leading to a variety of new languages, rather than a single standard.

Note that a similar problem also develops with Total Communication, when signed and oral languages are used simultaneously, since there is a strong tendency to adjust the syntax of the signed language to match that of the spoken one. Moreover, Johnson and Erting (in press, cited in Johnson, Liddell and Erting 1989:5-6) have demonstrated that a teacher's signing in a Total Communication environment is typically severely degraded, and only partially intelligible at best; whatever total communication is, it is not a natural sign language. The current emphasis on Total Communication in the United States has seriously hampered the ability of deaf people to communicate with each other (Bob Johnson, personal communication).

Trying to standardize a language (whether signed or oral) likewise has its problems. First, there is a danger of "over-standardizing" it, attempting to create more uniformity than is normal. For example, only one word may be allowed for a given concept, whereas natural languages normally have abundant synonyms, each with its own subtle shades of meaning and usage. Eliminating synonyms does not make a language more useful, but less; it impoverishes it. And, what is true for synonyms is also true for pronunciation; as we saw above with English, it is not unusual for half of the vocabulary to be pronounced differently by any two people.

To some extent, one can avoid the danger of overstandardization by choosing an actual dialect that is already in use by some people. Then, however, the question arises of which dialect to choose. If one dialect clearly has more prestige than all the rest, people will want to learn it with little outside prodding. Attempts at promoting the use of a prestigious dialect can be quite successful. However, if there is no clear consensus as to which dialect is "best", if people in each dialect think their own is best, then attempts to enforce conformity will be resented, resisted, and are almost certainly doomed to fail.

At this point, there have been no careful studies about such attitudes in MSL, but the evidence available suggests that a fair amount of interdialectal rivalry develops whenever there are attempts to define (or overdefine) a standard form of MSL. I mentioned earlier the numerous incidents in which a group of deaf people was put in a situation of having to demonstrate that their language was unified, and quickly got into arguments about which words were "correct". These arguments seem to have developed because of a false assumption that everybody needs to use exactly the same words in all cases for a language to be unified. Their intensity points to the pride each person has in his own way of signing, and the unlikelihood that they would accept any "standard" that did not include their own dialect as one option. Further, incidents were reported to me between older and younger speakers in which each expressed disfavor with the signing of the other group, the older signers being characterized as being old-fashioned and inflexible, the younger ones as disrespectful.

Bear in mind that I am not trying to divide the deaf community in pointing this out; the sentiments expressed are no greater than what would arise in a discussion about dialects in English. The actual differences are apparently minor, and do not impede communication. The important point is that each person feels very strongly that their way of signing is good. Any attempt at promoting a standard which does not clearly allow for individual and dialectal variation will most likely promote strong dissention within the deaf community, rather than helping unite it.

What then, should be done? I strongly recommend that if anything is to be done by hearing people to influence the deaf community's use of MSL, it should be to promote bidialectalism, rather than an artificially restrictive standard, Total Communication, or a signed version of Spanish. By "bidialectalism", I mean the ability to communicate effectively with people of other dialects, despite sometimes substantial differences. Bidialectalism, like bilingualism, is learned behavior, but since the amount to be learned is less, it can be acquired in a matter of weeks instead of years.

To some extent, bidialectalism may already exist, as deaf people report being able to communicate despite the differences in dialects. Still, this communication takes place face-to-face, so that misunderstandings can be quickly repaired; to be fully mature, bidialectalism would need to extend to such things as comprehension of television programs and video tapes. As noted above, we do not know to what extent bidialectalism such as this exists; this can be assessed better after intelligibility testing is done.

To promote bidialectalism, all that needs to be done is to bring people together in situations where they want to communicate. This could include social activities, organized sports, projects that would benefit the deaf community, etc. People will take care of the rest; they will learn each others' dialects without any need for expensive and elaborate projects to standardize the language.

Of course, much of this is happening already. What needs to be done is to identify groups of people that don't normally communicate with each other, and bring them together. A certain amount of linguistic and sociolinguistic research is helpful in identifying the nature and extent of dialectal differences, but people have been bridging linguistic gaps for hundreds of years without help from linguists and educators. Further, promoting communication within the deaf community is something that deaf people can do very well themselves, without specialized professional training. Indeed, they can probably do it better than hearing people can. The more that deaf people get involved in promoting communication between different subgroups of the deaf community, the more likely that a consensus language will grow which will be a synthesis of all current varieties of MSL, rather than a single restrictive or artificial variety.

It bears repeating that initiatives should arise from within the deaf community itself. These will be more likely to succeed than efforts by hearing outsiders. For example, LGM is better accepted by deaf people than HEN; one factor in this is probably that the authors of LGM are both deaf. Videos, television programs, and written materials should be developed by deaf people themselves, and should represent the way they actually sign, not any artificially imposed standard. If necessary, these materials could be accompanied by a short explanation of words or expressions that might be unfamiliar to some people, so as to promote understanding of a particular dialect within a wider community. And, a variety of dialects should be presented in such materials: young and old, Mexico City and elsewhere, rich and poor, etc.

Promoting bidialectalism would be easier if a practical writing system could be developed which was less clumsy and more precise than drawing pictures. This, unfortunately will probably have to wait until more is understood linguistically about the language. Boris Fridman has made considerable progress in this regard, but his work is not yet published. The Sutton system that was used in this study could form a good basis for such a system, but it is not the only one available, and the actual choice of an overall writing system should probably be made by deaf people themselves. That is, linguists can point out what details need to be written, and make suggestions on how to write them, but it is usually best if native speakers make the final decisions. Further, getting deaf people from a variety of backgrounds together to work on a writing system could be one of the encounters that promotes bidialectalism.

With regard to the needs of deaf service agencies in the United States, interpreters should definitely be trained in MSL who can assist Mexican deaf in their life in the USA, and guide them into learning American Sign Language. It probably doesn't matter what dialect of MSL is used to train interpreters; the language seems uniform enough that once someone learns one dialect, communicating with other dialects is not a great problem. Indeed, familiarity with a variety of dialects would be a distinct advantage.

Appendix: words used as a basis for this study

seis	six
siete	seven
ocho	eight
nueve	nine
diez	ten
familia	family
madre, mama	mother
padre, papa	father
esposo	husband
novio	boyfriend, fiance
hermano	brother
hijo	son
abuelo	grandfather
nieto	grandson
tio	uncle
niño	child
hombre	man
mujer	woman
amigo	friend
profesor	teacher
sordo(mudo)	deaf
policía	police
ley	law
sangre	blood
carne	meat
vivir	live
morir	die
fuerte	strong
débil	weak
preguntar	ask
¿que?	what?
¿quien?	who?
¿cuando?	when?
¿cuanto?	how much?
¿donde?	where?
no	no
sí	yes
si	if
dia	day
noche	night
sol	sun
luna	moon
lluvia	rain
casa	house
ciudad	city
dinero	money
comprar	buy
vender	sell

pagar	pay
rico	rich
piedra	rock
agua	water
tierra	land
montaña	mountain
árbol	tree
trabajar	work
ayudar	help
gracias	thank you
entender	understand
mosca	fly
ratón	mouse, rat
bueno	good
mal	bad
bien	well
nuevo	new
viejo	old (person)
joven	young (person)
limpio	clean
sucio	dirty
pelea	fight
fuego	fire
color	color
blanco	white
negro	black
rojo	red
azul	blue
verde	green
español	Spanish
inglés	English
nombre	name
historia	story, history
sueter	sweater
calor	heat
dios	god
diablo	devil
pecado, pecar	sin
confesar	confess
creer	believe
rezar, orar	pray
sacerdote	priest
paz	peace
amable	kind
enojado	angry
feliz	happy
triste	sad
frijoles	beans
manzana	apple
maíz	corn
dulce	sweet

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REFLEXIVES IN VERACRUZ HUASTEC

Peter G. Constable

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2 AG analysis of reflexives
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4 Clauses which involve reflexive verbal morphology
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1 INTRODUCTION

In this paper, I will consider various clause types in Huastec which are, in some sense, reflexive; this includes ordinary reflexives, which involve coreference, as well as other clauses. Two mutually exclusive morphosyntactic devices are used for reflexives in Huastec: reflexive pronouns, and verbal morphology; in this way, Huastec is like various European languages, including Spanish, Italian, Albanian, and Russian. Clauses involving reflexive pronouns are considered in §3, while those involving reflexive verbal morphology are considered in §4.

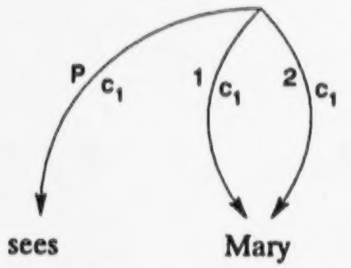
The analysis presented here adopts the frameworks of Relational Grammar (RG) and Arc Pair Grammar (APG). (These two frameworks will be referred to collectively as Arc Grammar, hereafter AG.) This presentation assumes a basic familiarity with these two frameworks, though some details of the formalisms will be introduced as the need arises. To begin, I will give a general outline of the manner in which reflexive clauses and coreference are treated within AG.

2 AG ANALYSIS OF REFLEXIVES

The claim made in Perlmutter and Postal 1984, Johnson and Postal 1980, and Postal 1982 is that ordinary reflexive clauses involve structures in which a single nominal heads two neighboring arcs (i.e. two arcs having the same tail) in the initial stratum. Thus, the initial structure of the clause in (1a) would be represented as in (1b):

(1) a. Mary sees herself.

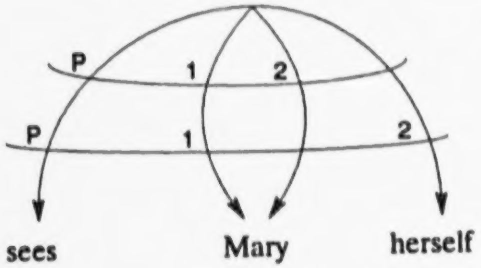
b.



This assumption is further generalized in the *multiattachment hypothesis*, which claims that languages permit multiattachment (MA) structures, in which a single nominal heads two neighboring arcs in a single stratum, initial or otherwise. This proposal has permitted a uniform and enlightening account of a recurrent phenomenon: that languages use reflexive morphology both in ordinary reflexive clauses, which involve coreference, as well as in other types of clauses which do not involve coreference (in particular, certain passive and unaccusative clauses) and which are otherwise apparently unrelated to ordinary reflexive clauses. (This situation in Huastec will be considered in §4.) The MA hypothesis has also permitted insightful accounts in several languages of facts seemingly unrelated to reflexive morphology, and has been argued for by Perlmutter (1978), Rosen (1981), and Berinstein (1984).

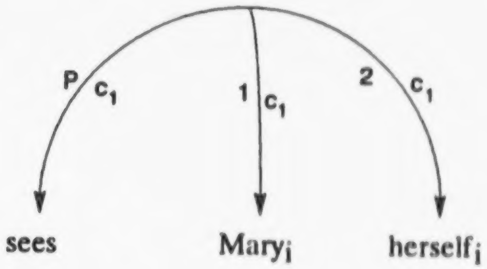
Another important notion that has accompanied the notion of MA is that of the *pronominal replacer*. It is assumed that MAs do not survive into the final stratum; all MAs must therefore be resolved. One way this can be achieved is with a pronominal replacer: of the two multiattached arcs, the one with the lower relation (on the hierarchy 1 > 2 > 3 > oblique) is *replaced* by an arc with the same R-sign and which has some form of pronominal element as its head. Thus, a more complete structure for (1a) above is given in (2):

(2)



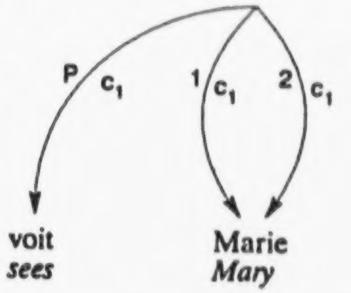
The original intent of the MA hypothesis was that MA could replace any syntactic notion of coreference.[1] Yet this has been brought into question by Rosen (1981) using evidence from Italian. While arguing decisively in favour of the MA hypothesis, Rosen also presents several arguments against the view that all cases of coreference involve MA. Specifically, she argues that reflexive clitics in Italian are a concomitant feature of MA, but that reflexive pronouns do not arise from MA and, rather, must occur in initial strata. Hubbard (1980) presents similar arguments from Albanian. Some of Rosen's arguments apply equally cross-linguistically, and a potential conclusion is that (non-clitic) reflexive pronouns in all languages occur in initial strata and do not arise from MA. The practical consequence of this is that both MA and some other syntactic device, effectively equivalent to co-indexing, are required to indicate coreference. Under this view, the sentence in (1a) would have the initial (and final) structure represented in (3), while the French example in (4a) would have the initial structure represented in (4b):

(3)



(4) a. Marie se voit.
Mary self sees
'Mary sees herself.'

b.



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[1] As observed by Postal and Pullum (1978, note 10), the representation of coreference by means of multiattachment is neither unique nor original to AG.

An evaluation of Rosen's arguments is beyond the scope of this paper. Within the AG literature, some have accepted her arguments while others hold to the view that coreference always involves MA; in particular, the latter view has been maintained by those working within APG. In describing clauses in Huastec which involve reflexive pronouns, I have simply chosen to present an analysis within the APG formalism with the assumption that coreference always involves MA. An analysis of these clauses that adopts Rosen's views would certainly be viable, and an evaluation of the two alternate analyses (and any others) would be in order. However, this decision relates only to clauses involving reflexive pronouns; therefore, it does not affect the major results of this paper which relate to clauses involving reflexive verbal morphology.

3 CLAUSES WHICH INCLUDE REFLEXIVE PRONOUNS

Ordinary reflexive clauses in Huastec, in which the 1 and 2 are coreferential, may contain a special anaphoric nominal:[2]

```
(5)     U    kaxu-al      t-u-baa7.
        1s/3 cut.hair-IMP CL-1sPOSS-self
        'I cut my own hair.'


(6)     A    cha7u-Ø t-a-baa7.
        2s/3 hit-PFV CL-2sPOSS-self
        'You hit yourself.'


(7)     In  chu7u-Ø t-in-baa7.
        3/3 see-PFV CL-3POSS-self
        'He saw himself. / She saw herself.'
```

This nominal is not, strictly speaking, a reflexive pronoun; rather, it is a possessed noun phrase whose head is **baa7** 'self'.

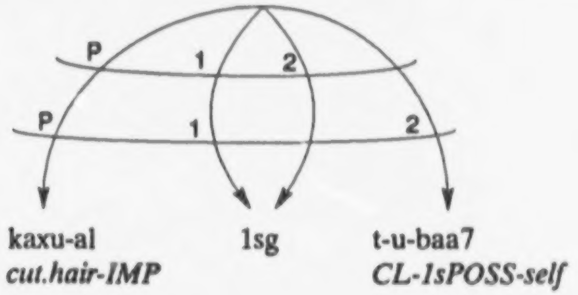
Examples (5)-(7) demonstrate key properties of reflexive clauses in Huastec which involve a reflexive pronominal element. First, they are finally transitive, as demonstrated by the use of a transitive agreement proclitic; in fact, there is consistently third person agreement with a final 2. The reflexive nominal is always possessed, and the possessor agrees in person and number with the 1.

---

[2] The orthography adopted here conforms to conventions familiar to Mayanists. The following conventions should be noted: *7* represents the glottal stop; *tz*, the voiceless alveolar affricate; *ch*, the voiced alveopalatal affricate; *th*, the voiceless interdental fricative; *x*, the voiceless alveopalatal fricative; and *j*, the glottal fricative. The sounds represented by *p*, *t*, *tz*, *ch*, and *k* have glottalized counterparts represented by *p'*, *t'*, *tz'*, *ch'*, and *k'*. Other symbols have the usual values.

The structure I propose for such clauses is represented in the following diagram, which corresponds to the clause in (5); for the moment, certain details will be suppressed.

(8)



This analysis accounts for the final transitivity. Also, the assumption that the reflexive nominal baa7 has associated with it the category [third person] accounts for the fact that the final 2 agreement is always third person. I know of no principled way to account for the presence of the proclitic ti on the reflexive nominal.[3]

Similar facts apply in ditransitive clauses in which the initial 1 and initial 3 are coreferential:

(9) Nanaa7 u t'ila-tzi-0 t-u-baa7 ti k^{w}ento.
1s 1s/3 tell-DAT-PFV CL-1sPOSS-self CL story
'I told myself a story.'

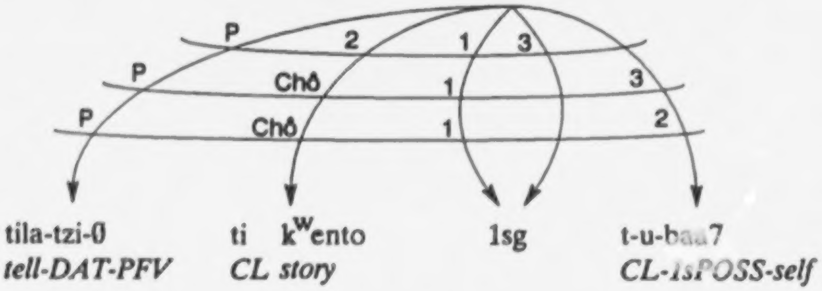
---

[3] One possible account would involve the introduction of a silent dummy nominal as a 2 "after" the introduction of the pronominal replacer. The dummy 2 would place the reflexive nominal en chômage with the resulting effect that this nominal would be flagged by ti, like other 2-chômeurs. As final 2, the dummy would determine third person final 2 agreement on the verb. I know of no independent evidence for the occurrence of a silent dummy nominal in such clauses, however.

Ti also occurs with obliques expressing time or location and, in particular, with relational nouns used in possessed noun phrases to express a location.

As described in Constable 1989, 3s in Huastec advance obligatorily to 2; thus, the reflexive nominal is, again, the final 2 and determines third person final 2 agreement on the verb. The structure of (9) is represented by the following diagram:[4]

(10)



To formalize an analysis of these facts, it will be necessary to delimit the conditions under which the reflexive nominal may occur as well as to identify its possible antecedents; such constraints may be expressed in terms of grammatical relations. In all of the data I have encountered, the possible antecedents are limited to 1s. The antecedent and the reflexive nominal must also occur within the same clause:

(11) U chalpa-y-al tin k^{w}atha-Ø (*t-u-baa7).
1s/3 think-?-IMP 2/1s hit-PFV (CL-1sPOSS-self)
'I think you hit me.'

The reflexive nominal may not replace an oblique nominal:

(12) a. Utat nanaa7 u k'^{w}aji-ba-Ø an t'ujub.
near 1s 1s/3 be-CAUS-PFV DEF rock
'I placed the rock near me.'

---

[4] There is an alternate analysis, equivalent to this one with regard to the surface facts, in which the initial 3 advances to 2 and then is replaced by the reflexive nominal. I know of no empirical evidence from Huastec to distinguish these two analyses; the alternate is systematically ruled out in APG, however, by a proposed universal: the *Coreferential Arc Law* (Johnson and Postal 1980:487). The choice between these two analyses would have bearing on the formulation of the rule describing the occurrence of the reflexive nominal, the *Reflexive Camouflage* rule (given in (22)). (See note 9.) It also has minimal consequences on the exact formulation of a rule relevant to ditransitive clauses which requires, in part, that 3s must obligatorily advance to 2.

b. *U k'^{W}aji-ba-Ø an t'ujub utat t-u-baa7.
1s/3 be-CAUS-PFV DEF rock near CL-1sPOSS-self
(same gloss)

(13) a. U k'^{W}aji-ba-Ø an t'ujub t-u waal.
1s/3 be-CAUS-PFV DEF rock CL-1sPOSS face
'I placed the rock beside me.'

b. *U k'^{W}aji-ba-Ø an t'ujub
1s/3 be-CAUS-PFV DEF rock

t-u waal t-u-baa7.
CL-1sPOSS face CL-1sPOSS-self

(same gloss)

c. *U k'^{W}aji-ba-Ø an t'ujub
1s/3 be-CAUS-PFV DEF rock

t-u-baa7 t-u waal.
CL-1sPOSS-self CL-1sPOSS face

(same gloss)

(14) Ø buxka-n-Ø t-in waal jajaa7.
3 sit-MID-PFV CL-3POSS face 3
'He$_{i}$ sat at his$_{i,j}$ side.'

(15) U cha7i-Ø an lemoox abal nanaa7.
1s/3 buy-PFV DEF lemon for 1s
'I bought the lemon for myself.'

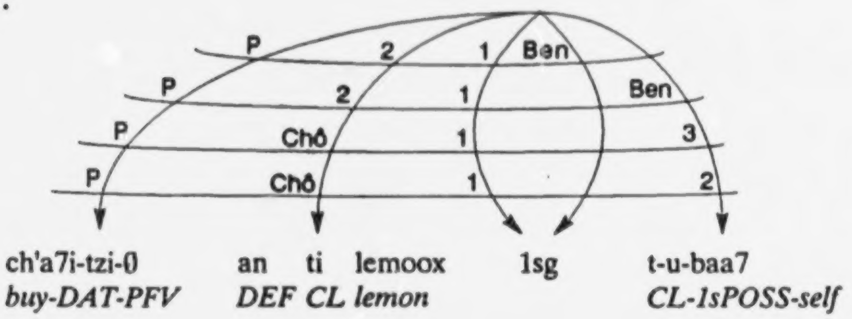
However, the reflexive nominal may occur when advancement to 2 also occurs, as in clauses involving benefactive advancement:[5]

---

[5] As is the case with ditransitive clauses (see note 3), there is an alternate analysis to the structure proposed in (16b) in which the initial Ben advances to 2 and then is replaced by the reflexive nominal. Again, there is no clear evidence in Huastec to distinguish the two analyses, but the alternate is systematically ruled out in APG by the *Coreferential Arc Law* (Johnson and Postal 1980:487). Of course, this choice will also have a bearing on the formulation of the Reflexive Camouflage rule (given in (22)). (See note 9.)

(16) a. U ch'a7i-tzi-0 t-u-baa7 an ti lemoox.
1s/3 buy-DAT-PFV CL-1sPOSS-self DEF CL lemon
'I bought myself the lemon.'

b.



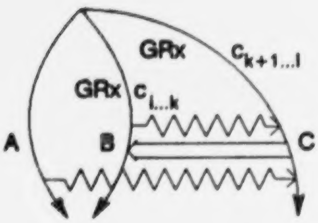
In order to formulate an explicit constraint that models these data, it will be necessary to appeal to notions within APG. It is the expressed intent of Johnson and Postal (1980; cf. §11.3) that the theory include universal constraints which have the effect of limiting the possible antecedents of anaphoric pronouns. Such constraints may preclude the need of any language-particular rule with this purpose in Huastec (or, perhaps, in any language). However, such constraints have yet to be proposed within the theory. Thus, for the present, a fully explicit rule for Huastec is still required. This rule will make key use of the important APG notion, *sponsor*.

A main feature of replacers in APG, by definition, is that the replacer has two sponsors: the arc which is replaced, and another *cosponsor*; this second sponsor is said to *second* the replacer. Thus, the relevant structure involved with replacers is as follows:[6]

Readers familiar with the RG literature will observe that the analysis proposed in (16b) violates the Oblique Law (cf. Perlmutter and Postal 1983:99-100) whereas the alternate suggested here does not. In APG, however, the Oblique Law is considered to be too strong a constraint, for reasons independent of analyses such as these, and is replaced by the *No Oblique Successor Law* (cf. Johnson and Postal 1980:249) which permits structures such as that in (16b) while upholding the original intent of the Oblique Law: prohibiting demotions to obliques.

6. For formal definitions of *replace* and *cosponsor*, see Aissen 1987:29 or Johnson and Postal 1980:110. For a formal definition of *seconds*, see Aissen 1987:29 or Johnson and Postal 1980:458.

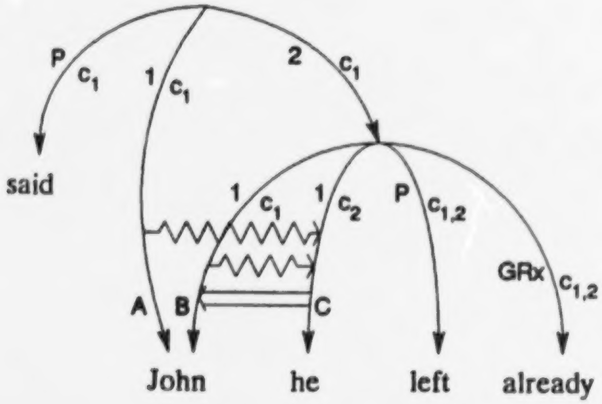
(17)



In this structure, arc C replaces B, and A seconds C. It is important to note that nothing requires that the cosponsors of a replacer be neighbors, as suggested by the structure in (17); this is clear from examples such as (18).[7]

(18) a. John$_i$ said he$_i$ left already.

b.



Here the replacee, B, is in the complement clause, but the seconder, A, is in the matrix clause.

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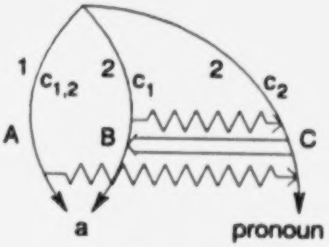
[7] Furthermore, there is nothing in the theory that requires that the cosponsors overlap, as also suggested by the structure in (17). However, we are interested here in cases of coreference, and therefore only in cases where the cosponsors do overlap (per the assumption made at the end of §2).

Certain other features of the structure in (17) are not required by the definition of *replace*, but are required by proposed universal constraints, namely the *Replacer Erase Law* (Johnson and Postal 1980:112), and the *Replacer Coordinate Law* (Johnson and Postal 1980:165).

In the APG treatment of ordinary reflexive clauses in Huastec, the replacer arc is not headed by the reflexive nominal, but rather by an anaphoric pronoun; the relevant substructure is represented in the following diagram:

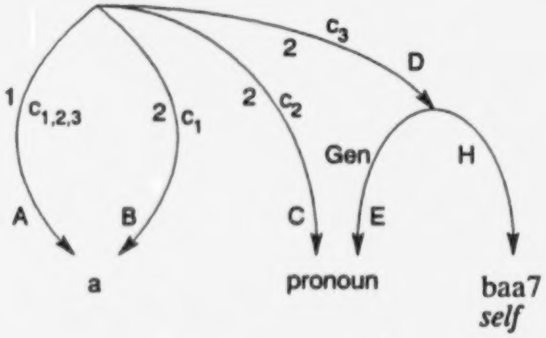
(19)



Since the cosponsors, A and B, overlap and are initial arcs, the replacer, C, is said to be a *coreferential arc*.[8]

In many languages, arc C in (19) would be a final arc, and the pronoun which heads C would appear as a reflexive pronoun (in languages that have reflexive pronouns). In Huastec, however, the pronoun which heads C is not a final 2 but, rather, is the *possessor* of the final 2. Thus, C is also replaced by another arc which has Gen (*genitive*) and H (*head*) branches, where **baa7** heads the H arc and the pronoun heads the Gen arc:

(20)



Arc D in (20) is referred to as a *camouflage arc*; this notion can be defined as follows (using (20) as a model): an arc D is a camouflage arc iff it replaces an arc C which has a successor, E, that is a branch of D, and E is a Gen arc.[9]

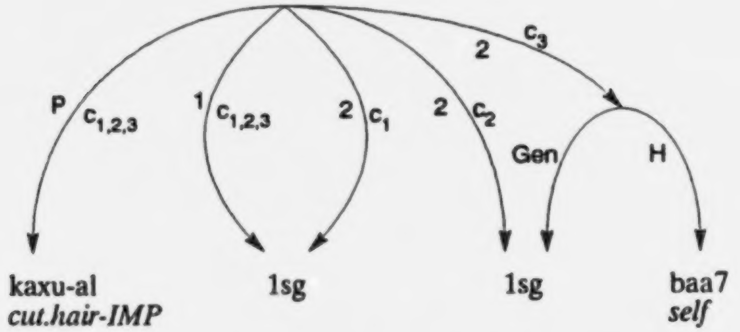
---

[8] For a formal definition of *coreferential arc*, see Johnson and Postal 1980:484. The conditions cited in the text are not those required by the definition; however, that they are sufficient can be demonstrated by theorem.

With this framework in mind, a more complete representation of the clause in (5), repeated here, is given as follows (with sponsor and erase relations temporarily suppressed):

(21) a. U kaxu-al t-u-baa7.
1s/3 cut.hair-IMP CL-1sPOSS-self
'I cut my own hair.'

b.



Given these formalisms, the rule describing the occurrence of the reflexive nominal may be expressed as a constraint on the occurrence of certain camouflage arcs:[10]

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[9] This differs from the definition of *camouflage arc* provided by Aissen 1987:83. These are effectively equivalent, however: camouflage arcs represent a specific variant of the more general notion *closure arc* (discussed below in the text); the definition given here makes use of this fact.

[10] As mentioned in notes 3 and 4, there is an alternate analysis of pronominal reflexives with a multiattached 3 or Ben arc in which advancement precedes replacement. However, such an analysis demands the rejection of an assumption within APG, embodied in the *Coreferential Arc Law* (Johnson and Postal 1980:487): that a coreferential arc may only replace an initial arc. This, in turn, would entail that another conjunct must be added to the rule in (22) which requires that the R-predecessor of the arc which is replaced by the coreferential arc must be an initial arc.

(22) **Reflexive camouflage rule**
An arc A is replaced by a camouflage arc which supports an H arc headed by **baa7** iff A is a 2 arc R-successor of a coreferential arc B which is seconded by a neighboring 1 arc.

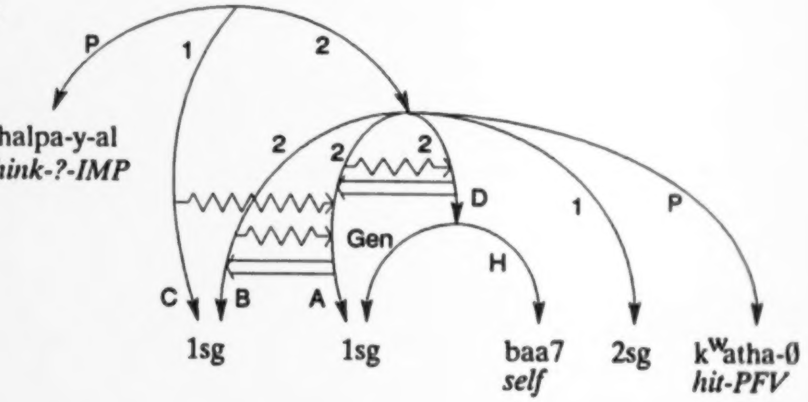
The restriction to camouflage arcs which support an H arc headed by **baa7** is required to distinguish these camouflage arcs from others involved with relational nouns (see below).

The requirement that A be a 2 arc entails that the camouflage arc must be a 2 arc (since, by definition, a replacer must have the same relation as the arc that it replaces); hence, this restriction reflects the fact that the reflexive nominal is always the final 2.

The requirement that arc B be a coreferential arc restricts its cosponsors to overlapping initial arcs, reflecting, as intended, the notion of coreference. The requirement that B's seconder be a neighboring 1 arc follows from the data, and, in particular, accounts for examples like (11) above, repeated here, in which a matrix clause 1 is coreferential with a complement 2, yet the reflexive nominal may not occur:

(23) a. *U chalpa-y-al tin k^{w}atha-Ø t-u-baa7.
1s/3 think-?-IMP 2/1s hit-PFV CL-1sPOSS-self
('I think you hit me.')

b. *

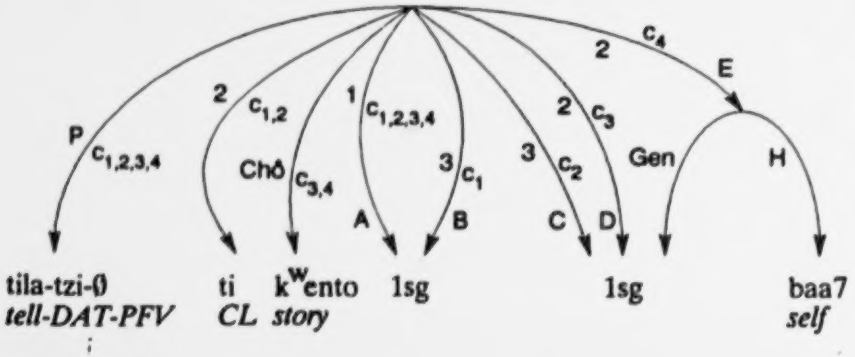


In the structure represented in (23b), arc A replaces arc B and is seconded by arc C. Since C and B overlap, A is a coreferential arc. However, the seconder, C, is not a neighbor of A; therefore, the conditions required by the rule in (22) are not satisfied and A may not be replaced by the camouflage arc, D. Thus, (22) accounts for

the fact that the antecedent of the reflexive nominal must be within the same clause.

Finally, the requirement in (22) that A be the R-successor of the coreferential arc B may best be explained by illustration: in cases which involve a multiattached initial 3 or Ben arc, such as (10) or (16), this arc is replaced by a coreferential arc, and then advancement to 2 follows. For example, consider the structure of (10), a more complete representation of which is given here:

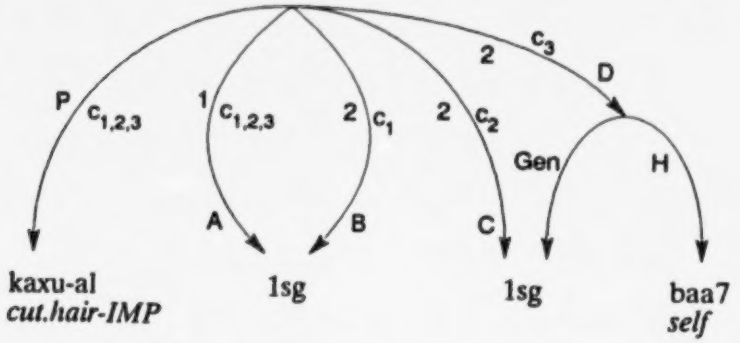
(24)



The initial 3 arc, B, is replaced by the coreferential arc, C. In turn, C has a 2 arc successor, D. Since D is the successor of C, it is also (by definition) the R-successor of C. Hence, by (22), D must be replaced by the camouflage arc E. A comparable situation applies for (16), which involves benefactive advancement. Note that it is not necessary to specify in (22) that advancement to 2 must take place: in the case of a coreferential 3 arc, an independently required rule determines that this arc must have a 2 arc successor. In the case of a coreferential Ben arc, advancement to 2 is not obligatory: thus, (15) above involves a coreferential Ben arc but not advancement to 2; its structure does not satisfy the conditions in (22), and, accordingly, it does not involve the reflexive nominal. It is exactly those cases which also involve advancement to 2 in which the reflexive nominal is required: this is captured by the rule in (22).

In contrast to examples such as (10) and (16), consider the structure in (21b), repeated here:

(25)



The initial 2 arc, B, is replaced by the coreferential arc C. Now, by definition, any arc is its own R-successor; so, C is a 2 arc R-successor of a coreferential arc (itself). Hence, in keeping with (22), C is replaced by the camouflage arc D.

There is one last detail about pronominal reflexives that remains to be accounted for: the fact that the anaphoric pronoun does not occur overtly. This appears to depend on the fact that the head noun of the reflexive nominal is **baa7**. The following examples, which have similar structures, are given for contrast. The use of a relational noun to show a locative relation is illustrated in (26). Relational nouns involve a camouflage structure nearly identical to the structure associated with reflexive nominals; the key difference in this case is that the head of the possessed noun phrase is **waal** 'face', rather than **baa7**. As well, the anaphoric pronoun need not be erased:

(26) a. (= (14))[11]

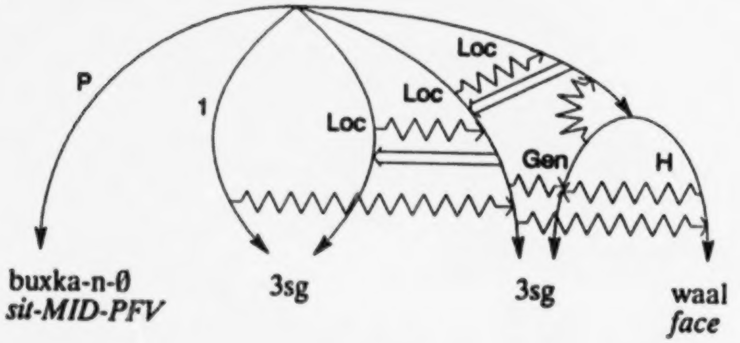
```
Ø buxka-n-Ø   t-in     waal jajaa7.
3 sit-MID-PFV CL-3POSS face 3
```
'He$_i$ sat at his$_{i,j}$ side.'

---

[11] Aspects of structure related to the occurrence of the "middle voice" suffix, -n (glossed 'MID') are suppressed; this has no bearing, however, on the features of this example which are relevant to the point at hand.

The structure in (26b) corresponds to the coreferential reading of the clause in (26a). The non-coreferential reading would have the same structure with the exception that the initial 1 and Loc arcs would not overlap.

b.

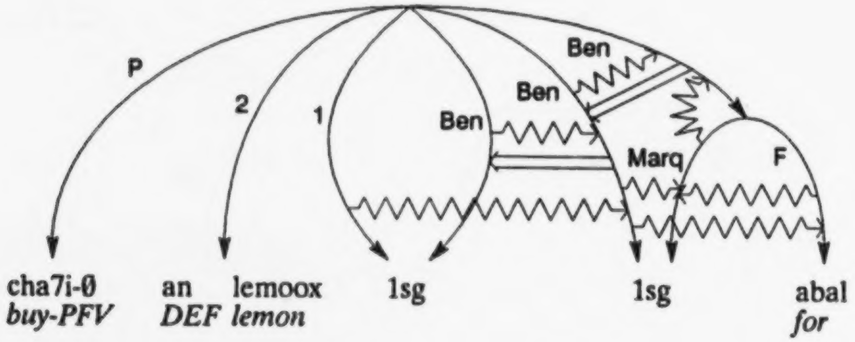

P
1
Loc
Loc
Loc
Gen
H
buxka-n-0
sit-MID-PFV
3sg
3sg
waal
face

Prepositional phrases are assumed in APG to involve *closures*, a structure similar to that associated with camouflage arcs:[12] whereas the arcs supported by a camouflage arc are Gen and H arcs, a prepositional phrase involves a *closure arc* which supports a Marq (*marquee*) arc and a F (*flag*) arc. This structure is illustrated by the following example:

(27) a. (= (15))

U ch'a7i-0 an lemoox abal nanaa7.
1s/3 buy-PFV DEF lemon for 1s
'I bought the lemon for myself.'

b.


P
2
1
Ben
Ben
Ben
Marq
F
cha7i-0
buy-PFV
an lemoox
DEF lemon
1sg
1sg
abal
for

---

[12] For a formal definition of *closure*, see Johnson and Postal 1980:611; see also Aissen 1987:68-72. The similarity between closures and structures associated with camouflage arcs follows from the definitions since *camouflage arc* is a special case of the more general notion *closure arc*.

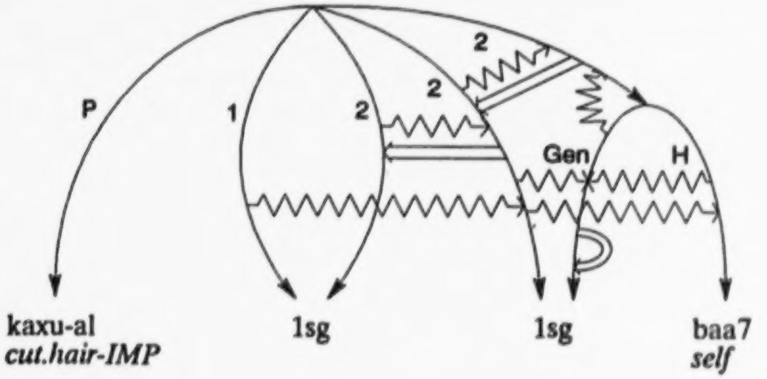
In the structure in (27b), the preposition **abal** 'for' and the pronoun **nanaa7** '1s' correspond respectively to the head noun **baa7** and the anaphoric pronoun in the reflexive camouflage structure. In this case, as in (26), the pronoun need not (in fact, may not) be erased.

Thus, some constraint is required to account for the mandatory erasure of the anaphoric pronoun in a reflexive camouflage structure; the appropriate constraint appears to be one requiring that if a Gen arc has a neighboring arc headed by **baa7**, then the Gen arc must self-erase.

(28) **Reflexive nominal erase rule**
If an arc A is headed by **baa7**, and B is a Gen arc neighbor of A, then B self-erases.

The erasure of the Gen arc accounts for the absence of the pronoun in the surface form, but does not prevent it from determining possessive agreement on the head noun. So, the more complete representation of (5) (= (21)) would be as follows:

(29)



4 CLAUSES WHICH INVOLVE REFLEXIVE VERBAL MORPHOLOGY

A second device, verbal morphology, may be used in certain clauses in Huastec that are, in some sense, reflexive. This applies to ordinary reflexives as well as other clause types: reflexive passive clauses, and reflexive unaccusative clauses; each of these will be discussed in the sections that follow.[13]

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[13] There is another clause type, reflexive antipassives, which also involves this verbal morphology. These are discussed by Constable (1989).

4.1 Ordinary reflexives

Ordinary reflexive clauses in which the 1 and 2 are coreferential may involve the use of a reflexive nominal, as described above, or, in some instances, may involve only the use of the verb suffix -n, glossed 'MID' (middle) in the examples.[14] (For convenience I will refer to ordinary reflexives of the former type as *pronominal reflexives* and to those of the latter type as *morphological reflexives*.) This difference is exemplified by the following examples:

(30) a. U cha7u-Ø t-u-baa7.
1s/3 hit-PFV CL-1sPOSS-self
'I hit myself.'

b. In cha7u-n-Ø.
1s hit-MID-PFV
'I hit myself.'

Certain facts should be noted about the example in (30b): the verb is suffixed with -n, the reflexive nominal does not occur, and the clause is finally intransitive, as evidenced by the agreement proclitic. It is unclear to me at present what semantic or pragmatic distinction there is, if any, between pairs such as these. It is also unclear whether both types of reflexive clauses may be freely formed with any transitive verb root, or whether some roots are restricted to occurrence in only one type or the other.

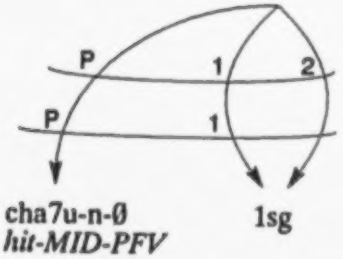
As with pronominal reflexives, morphological reflexives involve a structure in which there is a multiattachment in the initial stratum. In this case, however, MA is resolved by *cancellation*: the initial 1 arc persists into a second stratum, but the initial 2 arc does not. Thus, the structure of (30b) is represented as follows:[15]

---

[14] The term *middle* is used due to the similarity between the morphosyntax of this morpheme in Huastec and so-called *middle voice* and *medio-passives* in other languages, such as Albanian, Spanish, Welsh, Turkish, Russian, Classical Greek, Icelandic, etc.

[15] Certain proposals within APG rule out cancellation as a possible means of resolving MAs. In line with this, Postal 1982 presents an analysis of comparable clauses in French in which MA is resolved by replacement. However, this alone would make these clauses finally transitive. To account for final intransitivity in the French cases, Postal's analysis also involves a demotion to 3 of the replacement 2 arc. Such a proposal, in particular, would not work in Huastec since there are no final 3s but rather 3s

(31)



This structure accounts for the reflexive meaning and the final intransitivity. Cancellation also provides an adequate condition to describe the occurrence of the suffix -n; the required rule may be stated informally as follows:

(32) **Middle voice rule**
A verb is suffixed with -n iff there is a cancellation.

As with pronominal reflexives, morphological reflexives are not limited to clauses in which the multiattached arcs are initial 1 and 2 arcs, as demonstrated by the following example which involves advancement to 2 of an initial benefactive:

(33) Wawaa7 u k'a7i-tzi-n-al abal
1p 1p carry.water-DAT-MID-IMP because

ow-ich wa7 ti-i ach'a-al an mom.
far-CMP ? CL-1p/3 feel-IMP DEF pool

'We are carrying water for ourselves because we already feel like we're a long way from the pool.'

Since the initial benefactive in (33) advances to 2, a more general condition is suggested: cancellation may be used to resolve only the multiattachment of a 2 arc and a 1 arc. This requires an additional constraint:[16]

---

obligatorily advance to 2. Furthermore, Rosen 1981 considers a replacement analysis for comparable clauses in Italian and provides evidence that a cancellation analysis is comparable. Clearly, there are issues at stake here which are beyond the scope of this paper. Thus, I simply assume a cancellation analysis.

[16] If these examples do involve replacement rather than cancellation (see note 14), then this rule may not be required since, under the analyses proposed in §3, only multiattached 2 arcs could be replaced.

(34) **Cancellation rule**
A cancellation may only cancel a 2 arc which is multiattached to a 1 arc.

4.2 Reflexive passives

While the middle voice suffix -n may be used in ordinary reflexive clauses, in which there is coreference and reflexive semantics involved, it may also be used in various clauses which involve neither coreference or reflexive semantics. This is the case in the following passive clauses:

(35) Ø buk'u-n-Ø in itzich an wich
3 spread-MID-PFV 3POSS seed DEF flower

k'al an ik'.
by DEF wind

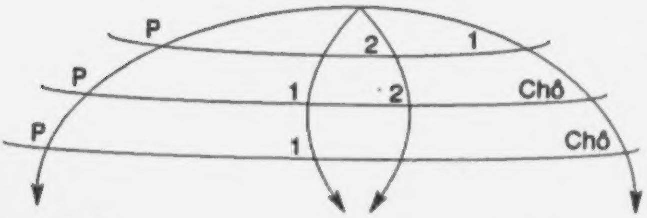
'The seeds from the flower were spread by the wind.'

(36) Ø thiipa-n-neek an te7 k'al i ch'a.
3 wind.around-MID-PRF DEF tree by INDEF vine
'The tree has been wrapped around by a vine.'

As with plain passives, clauses such as (35) and (36) are finally intransitive, the verb agrees with the patient nominal, and the agent nominal (if expressed overtly) is flagged by **k'al**. However, the verbs in these clauses do not have the special tense/aspect suffixes associated with plain passives; rather, the verb is suffixed by -n, and the tense/aspect suffixes are from a regular set used in other (non-passive) intransitive clauses.

The similarity that these clauses bear to plain passives is accounted for by the assumption that these clauses involve an advancement of a 2 to become the final 1, as in other passive clauses. To account for the occurrence of the suffix -n, the analysis proposed here involves a so-called *retroherent* advancement, in which an advancement occurs, but the nominal also maintains its "pre-advancement" relation; thus, the structure proposed for (36) is represented as follows:

(37)



thiipa-n-neek an te7 k'al i ch'a
wrap.around-MID-PRF DEF tree by INDEF vine

This structure accounts for the final intransitivity of (36), it correctly predicts that **te7** 'tree' should determine final 1 agreement and that **ch'a** 'vine' should be flagged by **k'al**, as are other 1-Chômeurs, and it satisfies the condition proposed in the previous section for the occurrence of the suffix -n.

The 2 that advances to 1 in a reflexive passive need not be an *initial* 2, as indicated by the following examples:

(38) In nuju-tzi-n-Ø ti olom k'al n-a Juan.
1s sell-DAT-MID-PFV CL pig by DEF-HON John
'I was sold the pig by John.'

(39) An chakam Ø chem-tzi-n-neek
DEF child 3 die-DAT-MID-PRF

k'al in taata7-tzik.
by 3POSS parent-PL

'The child has been orphaned (*lit.* The child has been died on by his parents.)'

These examples involve an initial 3 which advances to 2, and a possessor which ascends to become a matrix clause 2.

As with other passives, the agent need not be overtly expressed, though an agent will always be understood:

(40) Chaab oox i tamub ti-u kotzi-n-al.
two three INDEF year CL-1p cut-MID-IMP
'After two or three years, they are cut off.'

(41) Ø wat'i-n-neek an pakab.
3 squeeze-MID-PRF DEF sugar.cane
'The sugar cane has been pressed.'

A complete grammar of Huastec must include lexical diacritics for each verb which indicate whether or not it may occur in plain passive clauses and in reflexive passive clauses.[17] Some verbs, such as k'apu 'eat', may occur in reflexive passives only:

(42) a. U k'apu-n-al jey an kalaam.
U1p eat-MID-IMP also DEF pumpkin
'Pumpkins are also eaten.'

b. *U k'apu-aab jey an kalaam.
U1p eat-PASS.IMP also DEF pumpkin
(same gloss)

Other verbs of this type include t'ila 'say, tell', t'aja 'do, make', ach'a 'hear', and thutza 'write'.

Some verbs, such as utzbi 'accuse', thimk'a 'bewitch', and china 'hide', may only occur in plain passives:

(43) U china-aab an olom k'al an k^{W}e7
U3 hide-PASS.IMP DEF pig by DEF thief

abal ne7ech ka nuju-at al bitzow.
because go K3 sell-PASS.PFV in town

'The pig is being hidden by the thief because it is going to be sold in town.'

Finally, some verbs, such as ulu 'say', and kaxu 'cut hair', may occur in either plain or reflexive passives:

(44) a. Exom ti kaxu-n-al an inik abal
be T3 cut.hair-MID-IMP DEF man because

Ø nakthaa-ich in xi7-iil.
3 long-PRF 3POSS hair-POSS

'The man is getting a haircut because his hair is long.'

---

[17] The facts that follow are taken from Walker n.d.

b. Exom ti kaxu-aab an inik
be T3 cut.hair-PASS.IMP DEF man

abal Ø nakthaa-ich in xi7-iil.
because 3 long-PRF 3POSS hair-POSS

(same gloss)

It is unclear to me at present what semantic or pragmatic distinction there is, if any, between pairs such as these.

4.3 Reflexive unaccusatives

Perlmutter 1978 presents evidence that intransitive clauses in natural languages divide into two classes: those that take initial 1s, known an *unergative* predicates, and those that take initial 2s, known as *unaccusative* predicates; a stratum which contains a 1 but no 2 is known as an *unergative* stratum, and one which contains a 2 but no 1 is known as an *unaccusative* stratum[18]. In unaccusative structures, the Final 1 Law (which requires that every basic clause have a final 1) is generally satisfied by the advancement of the unaccusative 2 to 1; this type of advancement is known as *unaccusative advancement*.

In some basically intransitive clauses in Huastec, the suffix -n occurs on the verb:

(45) Exom ti paxk'u-n-al an ja7.
be T3 boil-MID-IMP DEF water
'The water is boiling.'

(46) Exom tin ooli-n-al.
be T1s go.bald-MID-IMP
'I'm going bald.'

Some of these verbs, such as **ooli** 'go bald', only occur in intransitive predications; other verbs of this sort include **xich'a** 'bleed', **jiilk'o** 'remain', **xalk'a** 'appear', **timk'o** 'disappear' **te7e** 'laugh', **uk'i** 'cry', **t'iku** 'jump', and **pit'k'o** 'flee'.

Other verbs which are suffixed by -n in basically intransitive clauses, such as **paxk'u** 'boil', may occur in transitive predications; with such verbs, the single argument in the intransitive predication corresponds to the patient in the transitive predication. Thus, compare (45) with (47):

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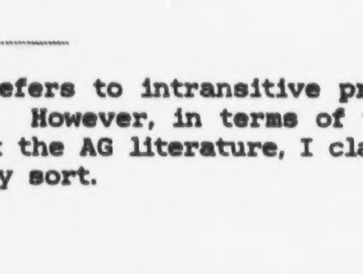
[18] The *unaccusative hypothesis* appears to have originated with Paul Postal, though the terms *unergative* and *unaccusative* are due to Geoffrey Pullum (cf. Pullum 1988).

(47) In paxk'u-al an ja7.
3/3 boil-IMP DEF water
'He boils the water.'

Verbs of this type include **junku** 'gather', **xuk'u** 'mingle, mix', **k'ipcho** 'lose' (*intr.* 'get lost'), **wilk'a** 'unravel', **wichi** 'decorate with flowers' (*intr.* 'blossom'), **buxka** 'seat' (*intr.* 'sit'), **k^{W}ajla** 'knock over' (*intr.* 'fall'), and, undoubtedly, many others.[19]

The most immediate way to account for these facts involves verb valences. Following the claims of Perlmutter 1978, I propose that all basically intransitive clauses in Huastec in which the verb is suffixed by -n have unaccusative initial strata, and that the valence of all such verbs requires that they occur in initial strata containing a 2. The difference between verbs like **paxk'u** 'boil' and verbs like **ooli** 'go bald' is also a matter of valence: verbs like **paxk'u** may optionally occur in initial strata which also contain a 1, but verbs like **ooli** must not occur in initial strata which contain a 1. Thus, **paxk'u** would be lexically marked as [±1, +2] (requiring an initial 2 and optionally occurring with an initial 1), and **ooli** would be marked lexically as [-1, +2] (requiring an initial 2 but not allowing an initial 1). Given that the clauses in question have unaccusative initial strata, the occurrence of the suffix -n may then be accounted for in precisely the same manner as was proposed for reflexive passives: a 2 advances to 1 retroherently resulting in a multiattachment which is resolved by cancellation. Thus, the structure of (46) would be represented as in (48), while the structures of (45) and (47) would be represented as in (49a) and (49b) respectively:

(48)



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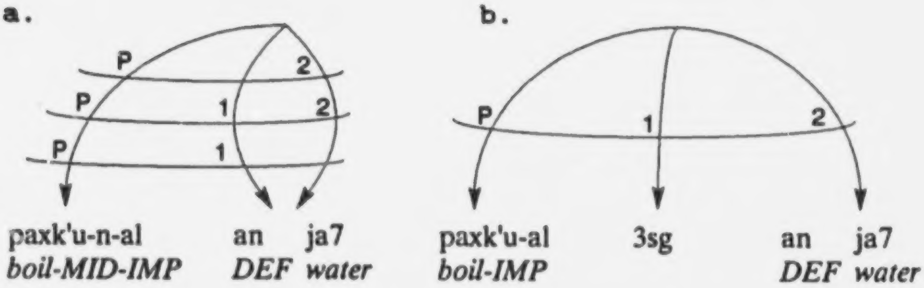
[19] Dayley 1983 refers to intransitive predications of such stems as *medio-passives*. However, in terms of the definition of *passive* adopted throughout the AG literature, I claim that such clauses are not passives of any sort.

(49) a. b.



In sharp contrast to verbs like **paxk'u**, I know of no verbs in Huastec which may be suffixed by -n in basically intransitive clauses and which may occur in a transitive predication such that the single argument in the intransitive predication corresponds to the agent in the transitive predication, i.e. verbs with the valence marking [+1, ±2] (requiring an initial 1 and optionally allowing an initial 2). Such a verb would be exemplified by the following English examples:

(50) a. He knitted.

b. He knitted a sweater.

This absence is predicted under the proposal being presented since such verbs would occur in initially unergative strata and there would be no opportunity for unaccusative advancement.

The reflexive unaccusative analysis of clauses like (45) and (46) presented here has several points in its favour. First, it maintains a simple and general account of the occurrence of the suffix -n. Secondly, it allows for consistent statements of verb valence; the only obvious alternative would require that if **paxk'u** occurs in an intransitive initial stratum, then the single argument must be a 1, but that if it occurs in a transitive initial stratum, then the argument with the corresponding semantic role must be a 2.[20] Clearly, the proposal being presented permits greater generality and simplicity in the statement of verb valence. Finally, this proposal also accounts for the otherwise unexplained absence in Huastec of verbs with the valence [+1, ±2] which may be suffixed by -n in basically intransitive clauses.

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[20] A biclausal analysis of transitive clauses with verbs like **paxk'u** which posits an abstract, phonologically null, causative verb as the predicate of the matrix clause would be able to maintain consistent, simple statements of verb valence. However, there is no evidence for such a predicate, nor for biclausality. Furthermore, such an analysis involves a structure that is substantially more complex. For these reasons, such an analysis is rejected.

Not all basically intransitive clauses in Huastec involve reflexive unaccusative structures; in fact, not even all initially unaccusative clauses involve reflexive unaccusative structure. Verbs like k^{W}e7 'steal', ubaat' 'play', and puna 'ride' have a valence of [+1, ±2]:

(51) a. In puna-al an bitzim.
3/3 ride-IMP DEF horse
'He rides a horse.'

b. U puneel.
U3 ride.IMP
'He rides.'

These occur in unergative (or transitive) initial strata and therefore clearly cannot occur in reflexive unaccusative structures. Of more direct interest are verbs like tz'utzi 'fill', and lo7o 'save' (*intr.* 'survive') which have a valence of [±1, +2]:

(52) a. In lo7o-al k^{W}a7 in kithtal.
3/3 save-IMP QUOT 3POSS companion
'He was saving his companions.'

b. Tam ti ok'o-n-Ø an peejee-x-talaab
when T3 finish-MID-PFV DEF fight.RECI-AP-NOM

Ø jilk'o-n-Ø chaab oox xi Ø lo7ey.
3 remain-MID-PFV two three REL 3 save.PFV

'When the war was over, only a few remained who survived.'

The obligatory argument with these verbs is the patient. Since it is assumed that the patient is the initial 2 in both the transitive and intransitive uses, the intransitive use must involve unaccusative initial strata; yet even so, these verbs are not suffixed with -n. Huastec also has verbs, such as bel 'walk', cheke 'become tired', pube 'grow', ch'aki 'rise', k'a7i 'become hungry', tuthe 'kneel', and waye 'become dry', which may not occur in transitive initial strata and have valences of [+1, -2] or [-1, +2] (I presently know of no tests to determine which of these verbs are unaccusative and which are unergative), yet which never take the suffix -n.

Since some initially unaccusative structures involve retroherent unaccusative advancement while other initially unaccusative structures do not, a lexical diacritic, [±retro], is required for every verb which may occur in unaccusative initial strata which indicates whether or not the verb may occur in structures involving retroherent unaccusative advancement. It is unknown to me at present whether or not Huastec has any verbs which may occur in both reflexive unaccusative structures and plain unaccusative structures.

4.4 Reflexive antipassives

Huastec has a class of clauses which involve transitive verbs yet which are superficially intransitive; thus, compare the following pairs of examples:

(53) a. Exom u tzuku-y-al i thak xeket-laab.
be 1s/3 sew-?-IMP INDEF white garment-NPOSS
'I am sewing a white dress.'

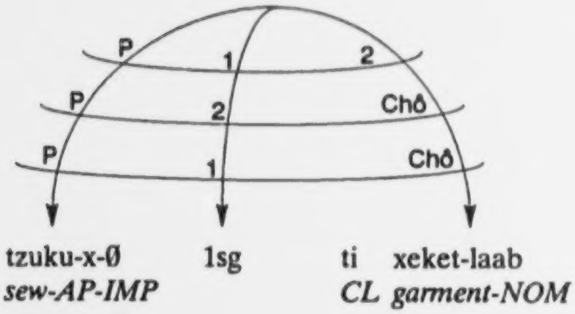
b. In tzuku-x-Ø.
U1s sew-AP-IMP
'I sew (things).'

c. In tzuku-x-Ø ti xeket-laab.
1s sew-AP-IMP CL garment-NPOSS
'I sew clothes.'

Several things are to be noted about the examples in (53). The subjects in (b) and (c) correspond to the subject in (a). Examples (b) and (c) are superficially intransitive, as evidenced by the use of intransitive agreement proclitics. The patient in the intransitive clauses may be unspecified, as in (b); when it is specified, as in (c), it is flagged by *ti*. The verbs in both in (b) and (c) have the suffix *-x*.

The analysis proposed for Huastec clauses such as those in (53b) and (c) is that they conform to the universal characterization of antipassives proposed by Postal (1977); thus, the proposed structure of (53c) is represented in (54):

(54)



This analysis accounts for most of the details noted above. First, given the assumption that, generally, a verb will have a constant valence and will map semantic roles onto initial grammatical relations in a consistent manner, then the initial stratum in (54) would be the same as the initial (and final) stratum for the transitive clause in (53a). Since the initial 1 in (54) is also the final 1, this structure predicts that the final 1 in (53a) will correspond to the final 1 in (53b) and (c). Secondly, the structure in (54) is finally intransitive, predicting the use of an intransitive agreement proclitic. Finally, the patient/initial 2 is a final chômeur and thus is flagged with ti, like other 2-chômeurs in Huastec (for a discussion of this, see Constable 1989). Thus, we see that the only addition to the grammar that is needed to account for the clauses in (53b) and (c) is a statement describing the occurrence of the suffix -x.

There are certain transitive verbs in Huastec which may occur in clauses that resemble antipassive clauses such as (53b) and (c) in many ways, yet in which the verb does not have the suffix -x but rather has the middle voice suffix -n; thus, consider the following sentences, involving the transitive root wa7u 'fan, blow air on':

(55) Jajaa7 in wa7u-y-al an inik.
3 3/3 blow-?-IMP DEF man
'He fans the man.'

(56) In wa7u-th k'al an ik'.
1s blow-PASS.PRF by DEF wind
'I have been blown by the wind.'

(57) Ø wa7u-n-neek an ik'.
3 blow-MID-PRF DEF wind
'The wind has blown.'

(58) Tam u wa7u-n-al chapik an ik',
when U3 blow-MID-IMP hard DEF wind

u k^{w}ajla-n-al in k'^{w}e7el an te7-tzik.
U3 fall-MID-IMP 3POSS branch DEF tree-PL

'When the wind blows hard, branches fall out of the trees.'

Consider also the following examples involving the roots **thaja** 'yell', and **t'aja** 'do, make':[21]

(59) Jajaa7 Ø thaja-n-Ø.
3 3 yell-MID-PFV
'He yelled.'

(60) Jajaa7 u t'ojo-n-al.
3 U3 do-MID-IMP
'He works.'

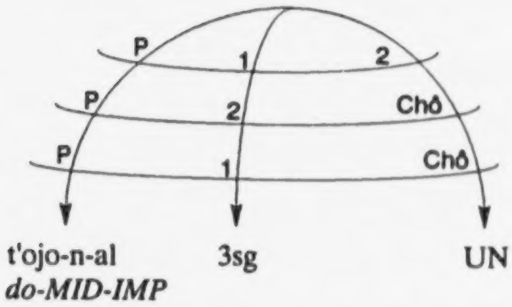
Three things are to be noted about the clauses in (57)-(60): the subjects correspond to the subjects that would be found in the corresponding transitive clauses; they are all finally intransitive, as indicated by the use of intransitive agreement proclitics; and the patients in each case are unspecified. These are most of the same features noted about the antipassive clauses in (53b) and (c) above; thus, it seems reasonable to expect that the clauses in (57)-(60) are structurally similar to the clauses in (53b) and (c), and to classify them together with (53b) and (c) as antipassive.

I claim that the structure of clauses such as those in (57)-(60) includes the basic structure proposed for plain antipassives; thus, the structure proposed for the clause in (60) includes the following sub-structure:

---

[21] There is some rule in the grammar that applies to the root **t'aja** in certain circumstances causing the /a/ in both syllables to change to [o]; thus, the following forms are attested: **t'ojo-n** 'do-MID', and **t'ojo-m** 'do-AP'.

(61)

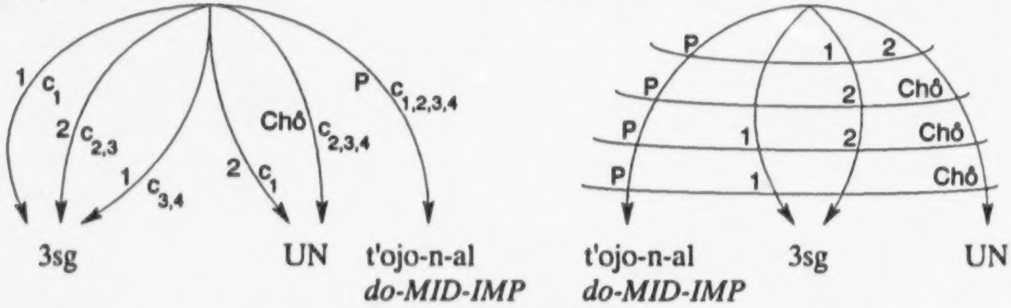

P
1
2
P
2
Chô
P
1
Chô
t'ojo-n-al
do-MID-IMP
3sg
UN

Just as the structure in (54) accounts for the facts noted about the antipassive clauses (53b) and (c), so also the structure in (61) accounts for the facts noted about (57)-(60).

The key issue with clauses such as (60) is to provide some account for the occurrence of the middle voice suffix -n. We have seen previously that the occurrence of -n is directly linked to the multiattachment of a 1 arc and a 2 arc. This multiattachment can arise in two ways: the structure may have multiattached arcs in the initial stratum, indicating coreference, or the multiattachment may arise due to a retroherent 2 to 1 advancement. The latter structure was posited for reflexive passives and reflexive unaccusatives.

Clearly, none of the clauses in (57)-(60) involve coreference; therefore, the occurrence of the suffix -n must be due to the multiattachment of a 1 arc and a 2 arc which arises from a retroherent 2 to 1 advancement. This condition can be readily incorporated into the analysis in (61); thus, the more complete structure of (60) is as represented in the following diagram:

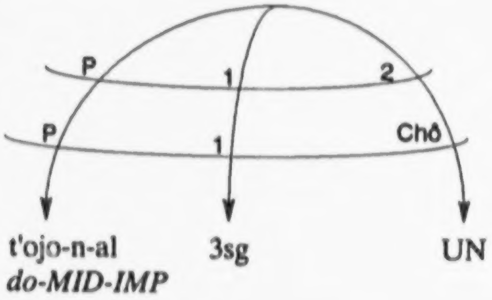
(62) a. b.


1
c_1
2
$c_{2,3}$
1
$c_{3,4}$
2
c_1
Chô
$c_{2,3,4}$
P
$c_{1,2,3,4}$
3sg
UN
t'ojo-n-al
do-MID-IMP
P
1
2
P
2
Chô
P
1
2
Chô
P
1
Chô
t'ojo-n-al
do-MID-IMP
3sg
UN

This analysis permits an account of clauses in Huastec like (60) based solely upon independently established rules in the grammar without the need for any additional constraints.

Davies 1984 presents data from Choctaw which provides evidence for the "middle" stratum in antipassive clauses in that language; this in turn provides some evidence in favour of the proposed universal characterization of antipassives. Yet, there has been little evidence from other languages for the "middle" stratum in antipassive clauses. Huastec, however, provides novel evidence for this stratum, based upon the clauses under consideration. The account given for the occurrence of -n in clauses like that in (60) critically depends on the assumption that these clauses involve a 2 to 1 advancement and, therefore, that the middle stratum posited for antipassives, in which the initial/final 1 is a 2, is indeed a part of their structure. The only clear alternative analysis for (60) is a structure which involves spontaneous demotion of the initial 2:

(63)



Yet the analysis in (63) fails to account for the occurrence of -n, and the only apparent way of accomplishing this is by some ad hoc rule. Hence, this analysis is in sharp contrast to that in (62) which requires no new rules but accounts for the occurrence of -n based upon the independently motivated middle voice and cancellation rules. Thus, I conclude that (62) is a valid representation of the structure of the clause in (60).

We have seen evidence for the "middle strata" in clauses, such as (57)-(60). Yet these clauses appear to represent a special case of the general notion of antipassive. Therefore, I conclude that the clauses in (53b) and (c) have the structure represented in (54), and, more generally, that antipassive clauses in Huastec have a structure that includes a "middle" stratum (strata) in which the initial/final 1 is a 2. This, in turn, provides support for the universal characterization of antipassive proposed by Postal (1977).

If the proposed universal characterization of antipassive is correct, then these too involve a 2 to 1 advancement. Thus, it would be expected that some language should allow antipassive structures in which the 2 to 1 advancement is retroherent; this appears to be the case in Huastec.

4.5 Conditions on the occurrence of -n

Assuming the validity of the unaccusative hypothesis of Perlmutter 1978 and of the proposed valences of verbs considered in the previous sections, then clauses in which the verb is suffixed by -n either (i) have structures which involve the advancement of a 2 to 1, or (ii) are reflexive clauses involving coreference, which, in terms of the theoretical framework assumed here, is represented by multiattached 1 and 2 arcs in the initial stratum.

Two obvious questions are raised by the facts presented here: What feature(s), if any, do *all* of these clauses share in common which may provide a sufficient (and, perhaps, necessary) condition for the occurrence of -n? Why is it specifically *these* types of clauses which share this morphosyntactic feature?

Interestingly, these very questions arise, with variation in language-specific details only, in numerous languages, such as Italian, Albanian, Russian, and others. Two proposals arising from research in AG, the multiattachment hypothesis and the unaccusative hypothesis, have played a significant role in providing answers to these questions which offer simple and general accounts of the data in question, in some cases capturing generalizations that had previously gone unnoticed, and which reveal significant cross-linguistic similarity. This similarity arises since, interestingly, the answer to the questions is consistent in all of these languages: all of the structures which share a particular (language-specific) morphosyntactic feature have some nominal which heads both a 1 arc and a 2 arc. This answer is embodied in the two rules of Huastec grammar proposed earlier:

(64) **Middle voice rule**
A verb is suffixed with -n iff there is a cancellation.

(65) **Cancellation rule**
A cancellation may only cancel a 2 arc which is multiattached to a 1 arc.

The condition that some nominal head both a 1 arc and a 2 arc may be satisfied in a general way by any nominal which heads a 1 arc and a 2 arc, without regard to syntactic levels, or in a more restricted way in which it is required, in addition, that the 1 arc and 2 arc both be in some stratum, i.e. that they are multiattached. It is clear that the more general condition is not sufficient for determining the occurrence of -n in Huastec since plain passives have a nominal which heads both a 1 arc and a 2 arc (the initial 2/final 1), yet the verb in such clauses in not suffixed by -n. Thus, multiattachment of a 1 arc and a 2 arc appears to be a necessary condition for the occurrence of -n. It alone is not a sufficient condition, however, since pronominal reflexives, as analyzed in §3, may have multiattached 1 arcs and 2 arcs, yet the verb in these clauses in never suffixed by -n. Thus, cancellation is a further necessary condition for the occurrence of -n. By limiting cancellation to multiattachments of 1 arcs and 2 arcs only, it becomes both a necessary and sufficient condition.

Aside from the features assumed by the rules in (64) and (65), (ordinary) reflexives, reflexive passives, reflexive unaccusatives and reflexive antipassives share little in common: reflexive passives, unaccusatives and antipassives involve a revaluation while reflexives do not; reflexives, reflexive passives and reflexive antipassives have transitive initial strata while reflexive unaccusatives have intransitive initial strata; in reflexives and reflexive antipassives the initial 1 is also the final 1 while in reflexive passives and reflexive unaccusatives the initial 1 is not the final 1.

The occurrence of -n cannot be attributed to semantics: this is ruled out at the lexical level since individual verbs may occur in both plain and reflexive passives or in both morphological and pronominal reflexive clauses; this is ruled out at predication or discourse levels since many verbs have lexical diacritics indicating that they must or must not occur in reflexive unaccusative structures, or that passive structures in which they occur must or must not be reflexive passives. Factors such as agentivity or control do not help: the arguments of reflexive unaccusative verbs like **xich'a** 'bleed' and **ooli** 'go bald' do not differ in agentivity or control from those of intransitive verbs like **pube** 'grow', **thot'e** 'evaporate', **waye** 'become dry' which are not suffixed by -n. On the other hand, **xich'a** and **ooli** do differ in agentivity and control from verbs such as **jilk'o** 'remain' and **t'iko** 'jump', yet all occur in reflexive unaccusative structures.

These facts provide strong evidence in favour of the rules in (64) and (65) and the structures proposed here; there appears to be no other potential account of the occurrence of -n which has the same simplicity and generality. Furthermore, the similarity between this account and accounts of comparable data which recur with significant regularity cross-linguistically adds additional support to this analysis.

ABBREVIATIONS

1sPOSS, etc.	person and number agreement for the possessor in possessed noun phrases
1s/3, 2/1s, etc.	person and number agreement for subject and direct object in transitive clauses; for a gloss of the form *a/b*, *a* cross-references the subject and *b* cross-references the direct object
AG	arc grammar (refers to arc pair grammar and relational grammar collectively)
APG	arc pair grammar
AP	antipassive
CAUS	causative
CL	clitic
CMP	completive
DAT	dative
DEF	definite
HON	honorific
iff	if and only if
IMP	imperfective
INDEF	indefinite
K1s, etc.	agreement clitic from the (transitive or intransitive) K-set (choice of clitic set used is determined by various factors including tense, aspect and mood)
MID	middle
NOM	nominalizer
NPOSS	non-possessed
PASS	passive
PFV	perfective
PL	plural
POSS	possessed
PRF	perfect
QUOT	quotative (evidential)
RECI	reciprocal
REL	relativizer
RG	relational grammar
T1s, etc.	agreement clitic from the intransitive T-set (choice of clitic set used is determined by various factors including tense, aspect and mood)
U1s, etc.	agreement clitic from the intransitive U-set (choice of clitic set used is determined by various factors including tense, aspect and mood)
UN	unspecified

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A TYPOLOGY OF KOINE RELATIVE CLAUSES

Martin M. Culy

1 Introduction
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1 Introduction

In this paper I endeavor to give a broad description of Koine Greek relative clauses. My database consists primarily of the Greek New Testament (Marshall and Nestle 1960). I begin by pointing out that Koine uses the strategy of relative pronouns in all relative clauses (Sect. 2). This section is followed by a description of the other ways in which relative pronouns are used besides introducing a relative clause (Sect. 3). In section 4, I discuss the position of the relative clause with respect to its head, arguing that only postnominal and internally headed relative clauses occur. Finally, in section 5, I give a description of the types of internally headed relative clauses (IHRCs) found in Koine and note three instances where they function adverbially.

Although this paper for the most part does not deal with formal syntax, I have noted several potential problem areas for current transformational syntax.

2 Strategies employed

Every relative clause in Koine Greek is introduced by a relative pronoun. Whereas many languages utilize different strategies for relativizing different types of nominals, e.g., obliques as opposed to subjects, Koine uses the same type of strategy for all nominals. This is exemplified in the data below. In (1) we have subject relativization:

(1) Acts 1:23

Καὶ ἔστησαν δύο, Ἰωσὴφ τὸν καλούμενον
and they set two Joseph the being called

Βαρσαββᾶν [ὃς ἐπεκλήθη Ἰοῦστος], καὶ
Barsabbas RP:NOM[1] was surnamed Justus and

Μαθθίαν.
Matthias

'And they appointed two, Joseph, called Barsabbas, who was surnamed Justus, and Matthias.'

In (2) we have object relativization:

(2) Acts 1:4

καὶ συναλιζόμενος παρήγγειλεν αὐτοῖς ἀπὸ
and meeting with he charged them from

Ἱεροσολύμων μὴ χωρίζεσθαι ἀλλὰ περιμένειν τὴν
Jerusalem not to depart but to await the

ἐπαγγελίαν τοῦ πατρὸς [ἣν ἠκούσατέ
promise of the father RP:ACC you heard

μου],
of me

'And meeting with them He charged them not to depart from Jerusalem, but to wait for the promise of the Father which you have heard from me.'

In (3) we have indirect object relativization:

(3) Hebrews 7:4

Θεωρεῖτε δὲ πηλίκος οὗτος, [ᾧ {καὶ}
Behold but how great this RP:DAT also

δεκάτην Ἀβραὰμ ἔδωκεν ἐκ τῶν ἀκροθινίων
a tenth Abraham gave of the spoils

ὁ πατριάρχης].
the patriarch

'Behold how great this man was to whom the patriarch Abraham gave a tenth of his spoils.'

And in (4) we have oblique relativization:

(4) Acts 20:18

ὡς δὲ παρεγένοντο πρὸς αὐτὸν εἶπεν
when but they came to him he said

αὐτοῖς· ὑμεῖς ἐπίστασθε, ἀπὸ πρώτης ἡμέρας
to them you understand from first day

[ἀφ' ἧς ἐπέβην εἰς τὴν Ἀσίαν]
from RP:GEN I set foot in the Asia

'you understand that from the first day on which I set foot in Asia'

There are, however, some curious examples where other strategies are used in combination with the relative pronoun. Consider Mark 7:25:

(5) Mark 7:25

ἀλλ' εὐθὺς ἀκούσασα γυνὴ περὶ αὐτοῦ,
but immediately hearing woman about him

[ἧς εἶχεν τὸ θυγάτριον αὐτῆς πνεῦμα ἀκάθαρτον]
RP:GEN had the daughter of her spirit unclean

ἐλθοῦσα προσέπεσεν πρὸς τοὺς πόδας αὐτοῦ·
coming fell at the feet of him

'But immediately, a woman hearing about Him, whose daughter had an unclean spirit, came and fell at His feet.'

Here we have a relative pronoun ἧς that is the possessor of the NP τὸ θυγάτριον 'the daughter'. Notice, however, that the same NP also has a pronominal possessor αὐτῆς 'her'. This is what has traditionally been described as a "pleonastic" or "redundant" pronoun. Such a construction, was attested, but rare, in classical Greek.

Its more frequent usage in the New Testament (although it is still used sparingly, see Appendix B) may be related to the frequency of use in the LXX (the Septuagint, a third century translation of the Hebrew Old Testament). In the LXX, this is clearly due to a literal following of the Hebrew text, where pleonastic pronouns are common. Presumably, out of reverence for the text, and since the usage was not unknown in Greek, these passages were translated literally. For examples of this in the LXX see Gen. 1:11, Ex. 6:26, Num. 13:33; 35:25.

(6) Exodus 6:26

οὖτος ᾿Ααρὼν καὶ Μωυσῆς, [οἷς εἶπεν αὐτοῖς
this Aaron and Moses RP:DAT said to them

ὁ Θεὸς ἐξαψαψεῖν τοὺς υἱοὺς Ἰσραὴλ
the God to bring out the sons Israel

ἐκ γῆς Αἰγύπτου]
out of the land of Egypt
'This is Aaron and Moses to whom God said to bring the children of Israel out of the land of Egypt.'

This presents a difficult structural problem. What is the D-Structure of examples such as (6)? The relative pronoun **οἷς** and the pronoun replacer **αὐτοῖς** 'them', if both present at D-Structure, would occupy the same node. This is clearly unacceptable. There is evidence, however, that relative pronouns in Koine are actually relative ***specifiers***. This would eliminate the problem of two constituents filling one node.

The redundant use of a pronoun replacer is not the only such "pleonasm" found in Koine relative clauses. There is one example in the New Testament where in addition to the relative pronoun, there also appears to be noun retention, i.e., the head noun is present both in the matrix clause and in the embedded clause.

(7) 2 Corinthians 10:13

ἡμεῖς δὲ οὐκ εἰς τὰ ἄμετρα καυχησόμεθα ἀλλὰ
we but not in the excess will boast but

κατὰ τὸ μέτρον τοῦ κανόνος
according to the measure of the length

[οὗ ἐμέρισεν ἡμῖν ὁ θεὸς μέτρου] ἐφικέσθαι
RP:GEN divided to us the God measure:GEN to reach

ἄχρι	καὶ	ὑμῶν.
as far as	even	you

'But we will not boast in excess, but according to the measure of length which God has given to us, to reach even to you.'

This verse is problematic in several ways. First of all, we have the unusual retention of the head noun in the relative clause in addition to the presence of the relative pronoun. To complicate matters more, both are "attracted" to the case of the genitive NP that modifies the antecedent, i.e., the relative pronoun has assumed the case of its antecedent. (The verb μερίζω 'to divide', excluding cases of attraction, takes its object in the accusative case.)

3 Idiomatic usages of relative pronouns

In order to give a thorough account of the relative clauses found in the New Testament, it is necessary to mention several instances where the relative pronoun is used idiomatically. In some cases it is not even used to introduce a relative clause. Each of these cases is listed in the appropriate Appendix with the references in which they occur in the New Testament. Traditional grammarians have used both the term "relative phrase" and "idiomatic phrase" to describe these constructions, although in the case of interpretative relative "phrases" they are clearly relative clauses.

3.1 Interpretative relative "phrases"

There are three constructions that fall under the category of interpretative relative "phrase", which in fact is a type of non-restrictive relative clause. All use a neuter nominative relative pronoun and are distinguished according to which of the following verbs they use: ἐστιν 'is' (most common), ἑρμηνεύεται 'is translated', or λέγεται 'is called'. The latter two are used exclusively in John's Gospel, although he utilizes ὅ ἐστιν (plus a verb) as well. All three are used to elaborate on the meaning of the antecedent. Consider these three examples from John.

(8) John 1:38

οἱ	δὲ	εἶπαν	αὐτῷ·	ῥαββί,	[ὅ
the:PL	and	they said	to him	Rabbi:MASC	RP:NOM

λέγεται	μεθερμηνευόμενον	διδάσκαλε],	ποῦ
is called	being interpreted	Teacher	where

μένεις;
you remain

'And they said to him, "Rabbi, (which means 'Teacher'), where are you staying?"'

(9) John 1:41

εὑρήκαμεν τὸν Μεσσίαν, [ὅ ἐστιν
we have found the Messiah:MASC RP:NOM is

μεθερμηνευόμενον χριστός].
being interpreted Christ

'"we have found the Messiah," (which means Christ).

(10) John 1:42

σὺ κληθήσῃ Κηφᾶς, [ὅ ἑρμηνεύεται
you shall be called Cephas:MASC RP:NOM is translated

Πέτρος].
Peter

'"you shall be called Cephas" (which is translated Peter).

While interpretative relative "phrases" most often elaborate on the meaning of an antecedent that is a proper name, they are not limited to such. Consider (11):

(11) Mark 15:16

Οἵ δὲ στρατιῶται ἀπήγαγον αὐτον ἔσω τῆς
the but soldiers led away him inside the

αὐλῆς, [ὅ ἐστιν πραιτώριον]
court:FEM RP:NOM is praetorium

"But the soldiers led him away inside the court, which is the praetorium"

For an exhaustive list of the examples found in the New Testament see Appendix C.

3.2 Conjoining relative phrases

I have placed two kinds of constructions under this heading following Robertson (1934). The first is formed by combining the preposition ἐν 'in, on, etc.' with a dative masculine relative pronoun. This can be either singular or plural, resulting in the adverbial meanings 'while' or 'meanwhile'. Consider these examples:

(12) Luke 5:34

μὴ δύνασθε τοὺς υἱοὺς τοῦ νυμφῶνος
not you are able the sons of the bride-chamber

ἐν ᾧ ὁ νυμφίος μετ᾽ αὐτῶν ἐστιν ποιῆσαι
in RP:DAT the bridegroom with them is to make

νηστεῦσαι;
to fast

'Are you able to make the children of the bride-chamber fast, while the bridegroom is with them?'

(13) Luke 12:1

᾿Εν οἷς ἐπισυναχθεισῶν τῶν μυριάδων τοῦ ὄχλου
in RP:DAT:PL being assembled the myriads the crowd

'Meanwhile, as a multitude of a crowd was assembled'

Of course, not all instances of this combination are idiomatic usages; some are normal relative clauses modifying an antecedent.

(14) Matthew 3:17

οὗτος ἐστιν ὁ υἱος μου ὁ ἀγαπητός,
this is the son of me the beloved
[ἐν ᾧ εὐδόκησα]
in RP:DAT I am well pleased

'This is my beloved Son in whom I am well pleased.'

There are other examples that are less clearcut than those listed above and in Appendix D that some might want to include in this category.

The second construction coming under this heading is formed by combining the preposition ἀντί 'for, instead of, etc.' with a genitive plural relative pronoun. The semantic force of the relative phrase being something like the

English "because". This is illustrated below:

(15) Luke 12:3

ἀνθ' ὧν		ὅσα	ἐν τῇ σκοτίᾳ
for	RP:GEN:PL	as many things as	in the darkness

εἴπατεἐν	τῷ	φωτὶ	ἀκουσθήσεται,
you said	in the	light	will be heard

'Because as many things as you said in the darkness will be heard in the light.'

Other examples of this construction can be found in Luke 19:44 and Acts 12:23.

3.3 Demonstrative relative phrases

In this relative phrase the relative pronoun is combined with μὲν/δὲ (particles used to introduce clauses that contrast, μὲν being the particle that introduces the first clause) to give the semantic force of "the one/the other" or "some/other".

(16) Matthew 21:35

καὶ λαβόντες	οἱ	γεωργοὶ	τοὺς	δούλους	αὐτοῦ
and taking	the	husbandmen	the	slaves	of him

ὅν	μὲν	ἔδειραν	ὅν	δὲ
RP:ACC:SING	some	they flogged	RP:ACC:SING	other

ἀπεκτειναν,	ὅν	δὲ	ἐλιθοβόλησαν.
they killed	RP:ACC:SING	other	they stoned

'And the husbandmen, taking his slaves, flogged one, killed another, and stoned another.'

The reader should notice that the relative pronouns do not individually agree in number with their antecedent, i.e., three "singular" relative phrases have been used to modify a plural antecedent.

This construction is virtually identical in its semantics to the combination of the article and μὲν/δὲ. Romans 14:2 is a perfect example of the apparent interchangeability of the two constructions.

(17) Romans 14:2

ὅς	μὲν	πιστεύει	φαγειν	πάντα
RP:NOM:SING	the one	believes	to eat	all

ὁ	δὲ	ἀσθενῶν	λάχανα	ἐσθίει
the	other	being weak	herbs	eats

'One man believes he may eat anything, another, who is weak, eats only herbs.'

The first clause uses the relative pronoun ὅς plus μὲν, while in the second part of this μὲν/δὲ construction the article ὁ is used with δὲ.

In demonstrative relative phrases the relative pronoun, in combination with μὲν/δὲ, functions as a type of nominal. Notice that in (16) the verbs δέρω 'flog', ἀποκτείνω 'kill', and λιθοβολέω 'stone' are not part of a relative clause introduced by the relative pronoun but rather are conjoined VPs in the matrix clause. This is true in all examples of demonstrative relative phrases. For an exhaustive list of the examples of this construction in the New Testament see Appendix E.

3.4 Other relative phrases

There are other constructions similar to those mentioned above that could possibly be included as relative phrases. However, since the evidence that they are idiomatic usages is less clear, I will only mention them in passing.

A dative relative pronoun combined with ὄνομα (in the nominative case) is the formula for ascribing a name to the antecedent. This usage seems to be a typical example of what has been called the "dative of possession" by traditional grammarians.

(18) Luke 1:26

πόλιν	τῆς	Γαλιλαίας	ᾗ	ὄνομα	Ναζαρέθ
city		of Galilee	RP:DAT:SING	name	Nazareth

'a city of Galilee, named Nazareth'

Further examples of this construction can be found in Luke 1:27; 2:25; 8:41; 24:13 and Acts 13:6.

Another possible example is the combination of the preposition ἀπό 'from' with a relative pronoun. However, it is difficult to call this an idiomatic phrase since the relative pronoun varies in gender. It seems to agree with an implicit head noun, perhaps ἡμέρα 'day, time', which is feminine, in some instances (e.g., Luke 7:45),and χρόνος 'time', which is masculine, in others (e.g., Luke 13:25).

(19) Luke 7:45

αὕτη	δὲ	ἀφ'	ἧς	εἰσῆλθον	οὐ	διέλειπεν
she	but	from	RP:FEM:GEN	I entered	not	ceased

καταφιλοῦσά	μου	τοὺς	πόδας
fervently kissing	of me	the	feet

'But she has not ceased from the time when I entered to kiss my feet.'

(20) Luke 13:25

ἀφ'	οὗ ἄν	ἐγερθῇ	ὁ	οἰκοδεσπότης
from	RP:MASC:GEN-IND	is risen	the	house master

'From the time when the house master rises'

The positing of these antecedents is, however, somewhat speculative. Of course, even if this should be called an instance of an idiomatic phrase, there are numerous examples where the combination of ἀπό with a relative pronoun is used in the normal way to modify an antecedent.

4 Position of the head noun with Koine relative clauses

At first glance Koine appears to be peculiar cross-linguistically in that it seems to have evidence of all three relative clause types: prenominal, postnominal and internally-headed.[2] The postnominal type is by far the most common, encompassing more than 95% of the relative clauses found in the New Testament. Other than those listed in Appendix A, all relative clauses in the corpus are postnominal. The following examples illustrate the construction:

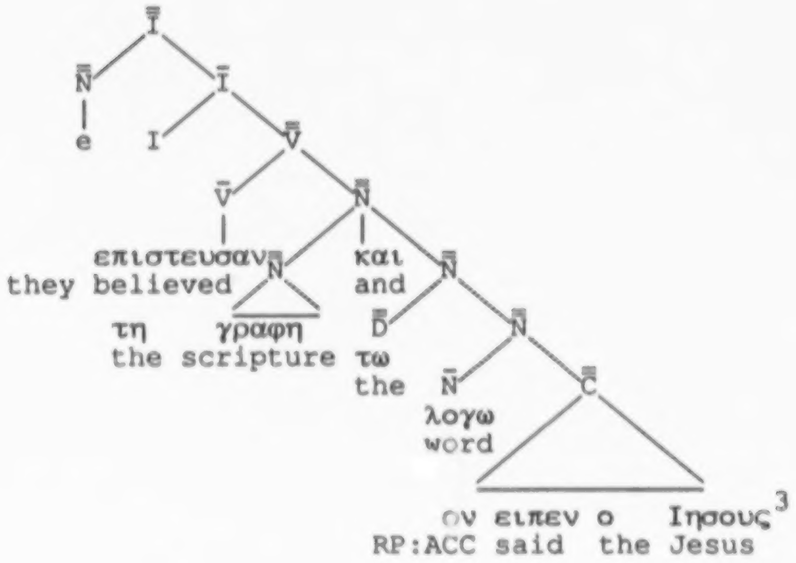
(21) John 2:22

ἐπίστευσαν	τῇ	γραφῇ	καὶ	τῷ	λόγῳ
they believed	the	scripture	and	the	word

[ὅν	εἶπεν	ὁ	'Ιησοῦς]
RP:ACC	said	the	Jesus

'they believed the scripture and the word which Jesus had said.'

(22)


I̿
N̿
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e
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επιστευσαν
they believed
N̿
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and
N̿
τη γραφη
the scripture
D̿
τω
the
N̅
N̅
C̿
λογω
word
ον ειπεν ο Ιησους[3]
RP:ACC said the Jesus

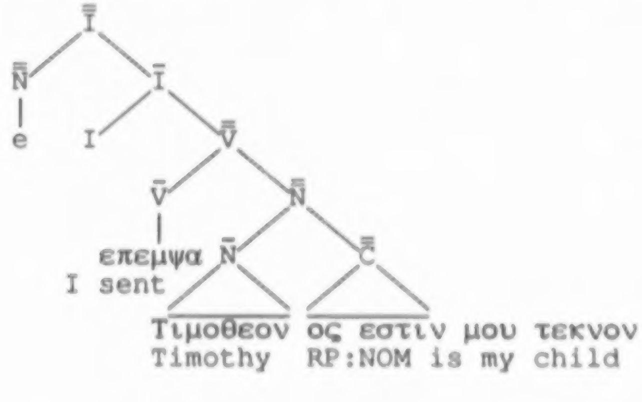
(23) 1 Corinthians 4:17

Διὰ τοῦτο αὐτὸ ἔπεμψα ὑμῖν Τιμόθεον
because of this very I sent to you Timothy

[ὅς ἐστιν μου τέκνον ἀγαπητὸν]
RP:NOM is my child beloved

'Because of this very thing I sent Timothy to you who is my beloved child'

(24)


I̿
N̿
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e
I
V̿
V̅
N̿
επεμψα
I sent
N̿
C̿
Τιμοθεον
Timothy
ος εστιν μου τεκνον
RP:NOM is my child

In both (21) and (23) the bracketed relative clause follows the head noun which it modifies. This, however, is not always the case. Consider (25) below, which appears to contain a prenominal relative clause:

(25) Luke 24:1

τῇ	δὲ	μιᾷ	τῶν	σαββάτων	ὄρθρου	βαθέως
the	but	one	the	week	while still	very early

ἐπὶ	τὸ	μνῆμα	ἦλθον	φέρουσαι
upon	the	tomb	they came	carrying

[ἅ	ἡτοίμασαν]	ἀπώματα
RP:ACC	they prepared	spices

'But on the first day of the week, while it was still very early, they came upon the tomb carrying the spices which they had prepared.'

Robertson (1934:718), however, lists this as an example of what is today called an internally headed relative clause. Thus he would bracket the verse as (26):

(26) Luke 24:1

τῇ	δὲ	μιᾷ	τῶν	σαββάτων	ὄρθρου	βαθέως
the	but	one	the	week	while still	very early

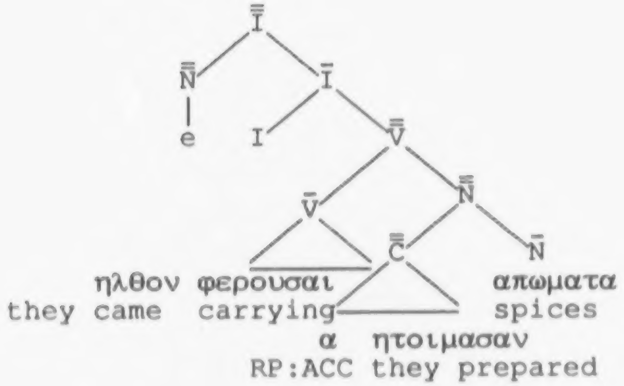
ἐπὶ	τὸ	μνῆμα	ἦλθον	φέρουσαι
upon	the	tomb	they came	carrying

[ἅ	ἡτοίμασαν	ἀπώματα]
RP:ACC	they prepared	spices

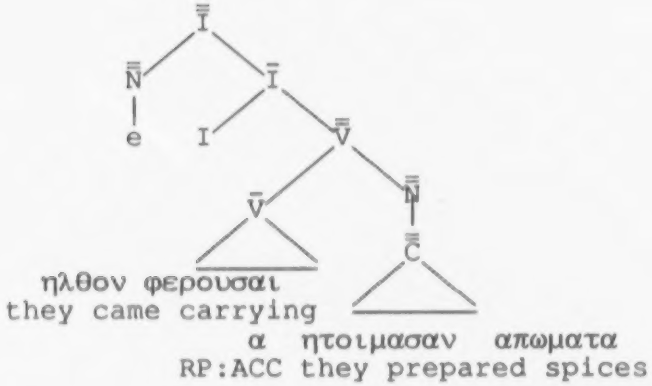
'But on the first day of the week, while it was still very early, they came upon the tomb carrying the spices which they had prepared.'

The question, then, is whether we treat this example and others like it as having structure (27) as a prenominal relative clause or, as having structure (28)as an internally headed relative clause:

(27)


I̿
N̿
e
I̅
I
V̿
V̅
N̿
C̿
N̅
ηλθον φερουσαι
they came carrying
απωματα
spices
α ητοιμασαν
RP:ACC they prepared

(28)


I̿
N̿
e
I̅
I
V̿
V̅
N̿
C̿
ηλθον φερουσαι
they came carrying
α ητοιμασαν απωματα
RP:ACC they prepared spices

With this example, and in fact in all the possible examples of prenominal relative clauses, there is no way to give a definitive answer, based on the data, as to whether it is a prenominal or internally-headed relative clause. The reasons for this are simple: whether the head is a constituent of the relative clause or the matrix clause it would receive the same case marking in most of the examples. In the remaining examples the case marking could be attributed to attraction. Romans 16:2 is one of the most likely candidates for a prenominal RC, but it can still be analyzed as an IHRC.

(29) Romans 16:2

παραστῆτε	αὐτῇ	ἐν	ᾧ ἄν	ὑμῶν
you may stand by	her	in	RP:DAT-IND	of you

χρῄζῃ	πράγματι
she may have need of	thing:DAT

'you may stand by her in whatever thing she might need.'

In this verse the head πράγματι 'thing' is clearly getting its dative case marking from the preposition ἐν 'in, on, etc.', which would appear to be in the matrix clause (although this too is subject to debate since ἐν could be in SPEC of $\bar{C}$ having been pied piped by the moved Wh-phrase).

Although some linguists have posited that Koine does in fact have prenominal RCs, e.g., Friberg (cited in Callow 1983a:34-36), all verses that are putative examples of prenominal RCs can be analyzed as IHRCs. It should be noted that the opposite is not true, i.e., all putative examples of IHRCs cannot be analyzed as prenominal RCs. Cross-linguistically, prenominal RCs have never been observed to use relative pronouns as a relativization strategy (Maxwell 1979:364); yet all the Koine RCs that Friberg posits as prenominal use a relative pronoun. Friberg's analysis of basic word order in Koine also indirectly provides counter-evidence to his prenominal RC analysis. He presents strong evidence for positing VSO as the basic word order in Koine. Typologists, however, have observed that postnominal RCs are almost without exception the only strategy found in verb-initial languages (Shopen 1985:144).

Neither of these are strong arguments against the prenominal RC analysis; however, before making claims that go against the cross-linguistic norm, a reasonably strong argument or presentation of strong evidence should be produced. This has not been done,[4] nor do I believe it is possible, in the case of Koine RCs.

On the other hand, we must deal with the fact that IHRCs have been observed exclusively in SOV languages (Keenan 1978:44). Of those who have proposed an analysis of Koine basic word order, none have posited that it is SOV. Thus the fact that IHRCs are present in Koine is as typologically odd as the putative prenominal RC examples--at least in terms of word order typology. Here, however, the fact that Koine has IHRCs (in the traditional sense) is undisputed. I have therefore chosen to treat all putative prenominal RCs as IHRCs.

Additionally, I might note that the majority of the traditional Greek grammarians have treated what appear to be prenominal RCs as IHRCs (e.g., Robertson 1934:718; Blass and Debrunner 1961:154).

4.1 Extraposition

Finally, we should note that Koine relative clauses may optionally be extraposed. For the purposes of this paper it is not necessary to give a detailed account of this phenomenon but simply to note its occurrence. An example of extraposition is found in Hebrews 7:13.

(30) Hebrews 7:13

φυλῆς	ἑτέρας	μετέσχηκεν,	[αφ'	ἧς	οὐδεὶς
tribe	another	he belongs	from	RP:GEN	no one

προσέσχηκεν	τῷ	θυσιαστηρίῳ]
has devoted himself	to the	altar

'He belongs to another tribe from which no one has devoted himself to the altar.'

In (30) the relative clause has been postposed to follow the verb phrase.

5 Internally headed relative clauses

There is a phenomenon in Koine that has been variously described by traditional grammarians as "incorporation", "assimilation", "transposition", etc. of a head noun into the relative clause. This corresponds to the linguistic notion of an internally-headed relative clause (IHRC). An exhaustive list of those verses exhibiting this phenomenon can be found in Appendix A. Mark 4:24 is a good example.

(31) Mark 4:24

ἐν	[ᾧ	μέτρῳ	μετρεῖτε]
with	RP:DAT	measure	you measure

μετρηθήσεται	ὑμῖν
it shall be measured	to you

'With the measure with which you measure, it shall be measured to you.'

We need to consider what it is that makes this an IHRC. Our first clue comes from the position of the head noun in relation to the relative pronoun. The relative clause in Koine always has a relative pronoun in the clause-initial position. Anything that follows the relative pronoun is thus a constituent of the embedded clause. Secondly, we notice that there is no overt head external to the relative clause.

IHRCs in Koine can be subdivided into various categories. The first of these contains IHRCs that function as adverbials.

5.1 Adverbial internally-headed relative clauses

There are three types of adverbial IHRCs: manner, reason, and time.

5.1.1 Manner. The construction ὅν τρόπον 'in the manner in which' functions as a manner adverbial. This construction is found in the following verses: Matthew 23:37, Luke 13:34, Acts 1:11; 7:28; 15:11; 27:25, and 2 Timothy 3:8. Consider the following example:

(32) Acts 27:25

οὕτως	ἔσται	καθ'	[ὅν	τρόπον
thus	it will be	in	RP:ACC	manner

λελάληταί	μοι]
it has been spoken	to me

'thus it will be in the manner in which it was spoken to me.'

The preposition here has been elided from κατά to καθ', a very common practice in Greek. This phrase is always used with both the relative pronoun and the head noun in the accusative case. The preposition is optional to the construction occurring only in Acts 15:11 and 27:25. Matthew 23:37 is an example where the preposition is absent.

(33) Matthew 23:37

ποσάκις	ἤθελησα	ἐπισυναγαγεῖν	τὰ	τέκνα
how often	I wished	to gather	the	children

σου,	[ὅν	τρόπον	ὄπνις	ἐπισυνάγει	τὰ
of you	RP:ACC	manner	bird	gathers	the

νοσσία	αὐτῆς	ὑπὸ	τάς	πτέρυγας]
young	of her	under	the	wings

'How often I wanted to gather your children in the manner in which (as) a bird gathers her young under her wings.'

5.1.2 Reason. A second adverbial construction is δι' ἥν αἰτίαν 'the reason for which'. This IHRC, which functions as a reason adverbial, can be found in the following verses: Luke 8:47, Acts 22:24, 2 Timothy 1:6,12, Titus 1:13, and Hebrews 2:11.

(34) Luke 8:47

ἰδοῦσα δὲ ἡ γυνὴ ὅτι οὐκ ἔλαθεν
seeing and the woman that not she was hidden

τρέμουσα ἦλθεν καὶ προσπεσοῦσα αὐτῷ
trembling she came and falling before him

δι' [ἣν αἰτίαν ἥψατο αὐτου]
for RP:ACC cause she touched him

ἀπήγγειλεν ἐνώπιον παντὸς τοῦ λαοῦ
declared before all the people

'And the woman, seeing that she was not hidden, came trembling and falling before him declared before all the reason for which she had touched him.'

This particular construction never occurs without the preposition in the New Testament.

5.1.3 Time. The third type of adverbial IHRC involves the relativization of a time word, e.g., ἥμερα 'day, time, season', καιρός 'time', or ὥρα 'time, hour'. Of these three, the use of ἥμερα is by far the most common, being found in Matthew 24:38, Luke 1:20; 17:27,29,30, John 9:14, Acts 1:2; 27:33, and Colossians 1:6,9. The other two are only found once each in the New Testament; καιρός in Acts 7:20, and ὥρα in Luke 12:40. These are illustrated below:

(35) Matthew 24:38

ἄχρι [ἧς ἡμέρας εἰσῆλθεν Νῶε εἰς
until RP:GEN day entered Noah into

τὴν κιβωτόν]
the ark

'until the day in which Noah entered into the ark.'

(36) Acts 7:20

Ἐν [ᾧ καιρῷ ἐγεννήθη Μωϋσῆς]
at RP:DAT time was born Moses

'at the time in which Moses was born'

(37) Luke 12:40

καὶ	ὑμεῖς	γίνεσθε	ἕτοιμοι,	ὅτι	[τῇ	ὥρᾳ
and	you	be	prepared	because	RP:DAT	hour

οὐ	δοκεῖτε]	ὁ	υἱὸς	τοῦ	ἀνθρώπου	ἔρχεται.
not	you think	the	son		of man	comes

'And you, be prepared because the Son of Man comes in an hour which you do not expect.'

The word ἡμέρα can also occur as an IHRC with the prepositions ἐν 'in, on, etc.' and ἀπό 'from'.

(38) John 9:14

ἦν	δὲ	σάββατον	ἐν	[τῇ	ἡμέρᾳ	τὸν	πηλὸν
it was	and	sabbath	in	RP:DAT	day	the	clay

ἐποίησεν	ὁ	Ἰησοῦς	καὶ	ἀνέῳξεν	αὐτοῦ	τοὺς
made	the	Jesus	and	opened	of him	the

ὀφθαλμούς].
eyes

'It was the sabbath on the day in which Jesus made the clay and opened his eyes.'

(39) Colossians 1:6

ἀφ᾽	[ἧς	ἡμέρας	ἠκούσατε	καὶ	ἐπέγνωτε
from	RP:GEN	day	you heard	and	fully knew

τὴν	χάριν	τοῦ	θεοῦ	ἐν	ἀληθείᾳ]·
the	grace		of God	in	truth

'From the day in which you heard and fully knew the grace of God in truth.'

This construction also occurs without the preposition:

(40) Luke 17:30

κατὰ	τὰ	αὐτὰ	ἔσται	[τῇ	ἡμέρᾳ
according to	the	same	it shall be	RP:DAT	day

ὁ	υἱὸς	τοῦ	ἀνθρώπου	ἀποκαλύπτεται].
the	son	the	of man	is revealed

'It shall be the same way in the day in which the Son of Man is revealed.'

It is interesting to note that if the writer/speaker wishes to modify the time word in any way, e.g., with an adjective, a postnominal RC construction must be used. This is exemplified below:

(41) Acts 20:18

ὑμεῖς ἐπιστασθε ἀπὸ πρώτης ἡμέρας
you understand from first day

[αφ᾽ ἧς ἐπέβην εἰς τὴν Ἀσίαν]
from RP:GEN I set foot in Asia

'You understand that from the first day from which I set foot in Asia'

Occasionally, the time word is omitted, leaving simply the preposition and the RP. Compare (42) with (40):

(42) 2 Peter 3:4

αφ᾽ [ἧς γαρ οἱ πατέρες ἐκοιμήθησαν], πάντα
from RP:GEN for the fathers fell asleep all

οὕτως διαμένει απ᾽ ἀρχῆς κτίσεως
thus remains from beginning of creation

'From (the day) when the fathers died, all things remain as they were from the beginning of creation.'

5.2 Other types

The remainder of the IHRC examples do not fall into any obvious category. First of all, we have those that are "normal" in terms of what has been attested in other languages. Two of these are the parallel passages to Mark 4:24 (29); namely Matthew 7:2 and Luke 6:38. The three other basic IHRCs are found in Matthew 10:11, Hebrews 7:14 and 1 Peter 1:10.

(43) Matthew 10:11

[εἰς ἥν (δ᾽) ἄν πόλιν ἤ κώμην
into RP:ACC-(and)-IND city or village

εἰσέλθητε],
you might enter

'And into whatever city or village you might enter'

(44) Hebrews 7:14

[εἰς ἥν φυλὴν περὶ ἱερέων οὐδεν
as to RP:ACC tribe concerning priests nothing

Μωϋσῆς ἐλάλησεν]
Moses spoke

'the tribe of which Moses spoke nothing concerning priests'

(45) 1 Peter 1:10

[περὶ ἧς σωτηρίας ἐξεζήτησαν καὶ
concerning RP:GEN salvation sought out and

ἐξηραύνησαν προφῆται
searched out prophets

'concerning the salvation which the prophets sought after and searched for'

Second, we have a small set of IHRCs that present us with some peculiar case marking facts. Consider the following two examples:

(46) Luke 3:19

περὶ πάντων [ὧν ἐποίησεν πονηρῶν ὁ Ἡρῴδης]
conc. all:GEN RP:GEN had done evils:GEN the Herod

'concerning all the evil things which Herod had done.'

(47) Luke 19:37

περὶ πασῶν [ὧν εἶδον δυνάμεων]
conc. all:GEN RP:GEN they saw powerful deeds:GEN
'concerning all the powerful deeds which they saw.'

Notice in these two examples there are two factors that lead us to analyze the head noun as an internal head.

The primary evidence comes from their physical position. They are definitely ***inside*** the relative clause; the relative pronoun and verb are adjacent on the left and the subject NP of the relative clause is adjacent on the right.

There is, however, a peculiar case marking fact presented by these examples. Consider example (46). The verb ποιέω 'do' subcategorizes for a direct object in the accusative case. However, the head noun πονηρῶν 'evils' is in the genitive case. It is therefore not case marked as the direct object of the relative clause. Furthermore, neither the syntax nor the semantics of the relative clause allow πονηρῶν 'evils' to fill any other constituent node within the relative clause. The only case assigner in the entire sentence that assigns genitive case is the preposition περὶ 'concerning'. The enigma that faces us, then, is that while the head noun πονηρῶν 'evils' is in the right position to receive accusative case marking from the verb of the relative clause it is somehow receiving genitive case marking from the preposition περὶ 'concerning' which is external to the relative clause.

6 Conclusion

In this paper I have sought to provide the reader with a concise typology of Koine relative clauses. I have shown that the Koine relative pronoun is used in various ways other than within the relative clause. I have shown that Koine has two types of relative clauses in terms of the order of the head noun in relation to the relative clause, namely postnominal and internally-headed. I argued that all putative examples of prenominal RCs can be analyzed as IHRCs. Finally, I illustrated the peculiar case marking facts presented by Koine IHRCs.

Appendices

APPENDIX A

EXAMPLES OF INTERNALLY HEADED RELATIVE CLAUSES
IN THE NEW TESTAMENT

MATTHEW

GEN--24:38
DAT--7:2,2; 24:44
ACC--10:11; 23:37

MARK

NOM--6:11
DAT--4:24
ACC--2:19; 6:16;

1 CORINTHIANS

ACC--7:39

2 CORINTHIANS

GEN--10:13

GALATIANS

ACC--2:10, 18; 4:1

LUKE

GEN--1:4; 1:20; 3:19; 17:27; 19:37
DAT--6:38; 12:40; 17:29,30
ACC--8:47; 9:4; 10:5,8,10; 13:34; 24:1

JOHN

DAT--9:14; 11:6
ACC--1:45; 3:32;5:38; 6:14,29; 8:26; 17:3;

ACTS

GEN--1:2; 25:18; 27:33
DAT--7:20; 21:16
ACC--1:11; 7:28; 15:11,12; 22:24; 27:25

ROMANS

GEN--4:17
DAT--16:2
ACC--7:1,19,19

COLOSSIANS

GEN--1:6,9

2 TIMOTHY

ACC--1:6,12; 3:8

TITUS

ACC-1:13

HEBREWS

GEN--13:11
ACC--2:11; 7:14

1 PETER

GEN--1:10

TOTALS

NOMINATIVE -- 1
GENITIVE -- 15
DATIVE -- 13
ACCUSATIVE -- 36
65

APPENDIX B

EXAMPLES OF RELATIVE CLAUSES WITH REDUNDANT PRONOUNS IN THE NEW TESTAMENT

MARK

NOM--13:19
GEN--1:7; 7:25

LUKE

NOM--23:51
GEN--3:16
DAT--12:48,48

ACTS

ACC--15:17

1 PETER

NOM--2:24

REVELATION

GEN--13:8,12; 20:8
DAT--7:2
ACC--3:8; 7:9

TOTALS

NOMINATIVE -- 3
GENITIVE -- 6
DATIVE -- 3
ACCUSATIVE -- 3
15

APPENDIX C

EXAMPLES OF INTERPRETATIVE RELATIVE PHRASES IN THE NEW TESTAMENT

MATTHEW

NOM--1:23; 27:33

MARK

NOM--3:17; 5:41; 7:11,34;
12:42; 15:16,22,34,42

JOHN

NOM--1:38,41,42

ACTS

NOM--4:36

COLOSSIANS

NOM--1:24

HEBREWS

NOM--7:2

REVELATION

NOM--21:17

TOTALS

NOMINATIVE -- 18
18

APPENDIX D

EXAMPLES OF CONJOINING RELATIVE PHRASES IN THE NEW TESTAMENT

MARK

DAT--2:19

LUKE

GEN--12:3; 19:44
DAT--5:34; 12:1; 19:13

JOHN

DAT--5:7

ACTS

GEN--12:23
DAT--26:12

ROMANS

DAT--8:3

1 PETER

DAT--2:12; 3:16

TOTALS

GENITIVE -- 3
DATIVE -- 9
12

APPENDIX E

EXAMPLES OF DEMONSTRATIVE RELATIVE PHRASES IN THE NEW TESTAMENT

MATTHEW

NOM--13:8,8,8,23,23,23
22:5,5
DAT--25:15,15,15
ACC--21:35,35,35

MARK

NOM--4:4
ACC--2:5,5

LUKE

NOM--8:5
ACC--23:33,33

ACTS

ACC--27:44,44

ROMANS

NOM--14:2,5,5
ACC--9:21,21

1 CORINTHIANS

NOM--14:2,5,5
DAT--12:8
ACC--12:28

2 CORINTHIANS

DAT--2:16,16

2 TIMOTHY

NOM--2:20,20

JUDE

ACC--22,23,23

TOTALS

NOMINATIVE -- 17
GENITIVE -- 0
DATIVE -- 6
ACCUSATIVE -- 15
38

NOTES

1. I use the following abbreviations and conventions throughout this paper:

ACC --accusative case
DAT --dative case
FEM --feminine
GEN --genitive case
IHRC --internally-headed relative clause
IND --indefinite
LXX --the Septuagint
MASC --masculine

NOM	--nominative case
NP	--noun phrase
PL	--plural
RC	--relative clause
RP	--relative pronoun
SING	--singular

2. Koine also has what has generally been referred to as "free" or "headless" relative clauses. In this type of RC there is no overt antecedent. A good example of this is Matthew 10:38.

(1) Matthew 10:38

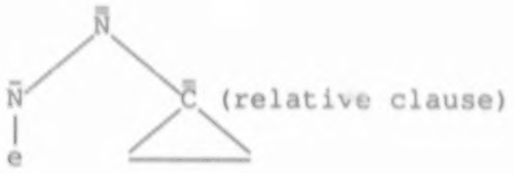
καὶ	[ὅς	οὐ	λαμβάνει	τὸν	σταυρὸν	αὐτοῦ
and	RP:NOM	not	take	the	cross	of him

καὶ	ἀκολουεῖ	μου],	οὐκ	ἔστιν	μου	ἄξιος.
and	follow	me	not	is	of me	worthy

'And (the one) who does not take his cross and follow me is not worthy of me.'

This, and other, "free relatives" are characterized by the following phrase marker:

(2)



3. I will refrain from using accent or breathing marks in the Koine phrase markers (PMs) as this will improve the format of the PMs.

4. There are a couple of other slightly different types of verses that might be construed as further examples of prenominal RCs. These come from Appendix A and include John 3:32; 5:38; 8:26 and Galatians 2:18. In these verses there is no overt head noun. However, there is a noun modifier which *follows* the relative clause. I rule out the possibility of them being prenominal RCs for the same reasons that were listed in section 4. These can be treated as postnominal RCs with a null head since Koine grammar would allow for a relative clause to occur between the head noun and its determiner.

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SWITCH REFERENCE IN MBYA GUARANI: A FAIR-WEATHER PHENOMENON

Robert A. Dooley

1 Introduction
2 Phenomena requiring more than one type of description
  2.1 Internal and external descriptions
  2.2 Marked and unmarked modes of use
  2.3 On-call phenomena and fair-weather phenomena
3 Signalling grammatical subject: straightforward cases
  3.1 Switch reference markers
  3.2 Subject, agent, and topic
    3.2.1 Subject vs agent
    3.2.2 Subject vs topic
  3.3 Subject sets
4 Strict inclusion of nonempty subject sets
  4.1 Strict inclusion with different grammatical person
  4.2 Strict inclusion with same grammatical person
  4.3 Agent/topic
5 Empty subject sets
  5.1 Impersonal passives, temporal, and ambient clauses
  5.2 Only one empty subject set
  5.3 Two empty subject sets
    5.3.1 Clauses of the same semantic type
    5.3.2 Clauses of mixed types
6 Residual factors
7 Concluding remarks

1 INTRODUCTION

SWITCH REFERENCE is a phenomenon found in some languages, by which certain clauses contain a signal indicating whether that clause has the same or different subject referent as a neighboring clause. Following Haiman and Munro (1983:xii), I refer to the clause in which the switch-reference marking is found as the MARKING CLAUSE, and the clause with reference to which same or different subject is calculated as the REFERENCE CLAUSE.

Haiman and Munro (p. xi) observe that, for the purposes of switch reference, "characterization of the notion 'subject' is strictly syntactic, rather than semantic or pragmatic in most cases: it is not the agent or the topic whose identity is being traced." Switch reference in the Mbyá dialect of Guarani[1] follows this characterization, in the following sense: "in most cases", switch reference signals sameness or difference of grammatical subject; but in exceptional circumstances, it signals sameness or difference of other kinds, involving semantic or pragmatic information that is different from grammatical subject reference. The signalling of subject reference can be considered to be the unmarked use of switch reference in Mbyá, occurring in the vast majority (over 98%) of cases; the signalling of other, semantico-pragmatic information is a marked use.

The "exceptional circumstances" that give rise to the marked use can be broadly characterized as those that would make its unmarked use difficult; that is, situations in which the calculation of sameness or difference of subject reference cannot be accomplished in a straightforward manner. Notably, this occurs when the subject referents of the two given clauses are in a strict inclusion relationship or when neither clause has subject reference. Abandoning the unmarked use because of difficulties suggests the notion of "fair-weather phenomenon"; this will shortly be explained further.

Section 2 discusses phenomena that require more than one type of description, briefly exploring several distinctions relevant to a mixture of grammatical and extragrammatical facts. Section 3 presents straightforward cases in the unmarked use of Mbyá switch reference. Complications for the unmarked use are presented as arising from the strict inclusion of subject reference (Section 4) and from empty subject reference (Section 5). In Section 6 there is a brief discussion of some questions raised by fair-weather phenomena.

2 PHENOMENA REQUIRING MORE THAN ONE TYPE OF DESCRIPTION

In this paper, I will claim that switch-reference marking in Mbyá has several modes of use, which require different kinds of description. Specifically, I claim that there is an unmarked mode of use that has a grammatical ("internal") description, as well as other, marked modes of use that require extragrammatical ("external") descriptions. Among phenomena with such marked and unmarked modes, we can further distinguish at least two subtypes: on-call phenomena and fair-weather phenomena; Mbyá switch-reference marking is of the latter type.

2.1 Internal and external descriptions

Consider a syntactic phenomenon which can be accounted for by means of a rule involving only grammatical features, such as grammatical subject, and another phenomenon which can be satisfactorily accounted for only if extragrammatical factors, such as the discourse-pragmatic notion of topic, are brought in. In Hyman's (1984) terms, the first phenomenon has an internal explanation, while the second calls for an external explanation: "an internal explanation will propose an account in terms of the nature of syntax itself, while an external explanation will attempt to relate the syntactic problem to phenomena outside the realm of syntax (e.g. semantics or pragmatics)" (Hyman 1984:67). I prefer the term "description" to "explanation" in this context.

If we require that a valid description have observational adequacy (i.e., that it hold for all instances of the phenomenon (Chomsky 1965)), then the distinction between internal and external descriptions becomes sharper and more useful. If, for example, an internal description covers only 85% of the given instances, then we should consider formulating either some other kind of internal description or else put forward an external description. A similar thing holds if we find ourselves with an external description that is less than observationally adequate (Nunberg 1981).

It is possible for a phenomenon to have both a valid internal description and a valid external description; this appears to be the case with the positioning of the Wayampi interrogative marker **po** (Dooley (to appear), section 4.3). Many phenomena with valid internal descriptions, however, appear to have external descriptions or explanations that are only partially valid. These are grammatical phenomena that are only partially motivated by extragrammatical factors.

Are there phenomena without a valid description of either type? The view of language as an organized activity would seem to be against this; however, it is not uncommon for descriptions of whatever type to end up with a certain amount of intractible "residue". The assumption adopted here is that if a phenomenon as a whole does not have a valid description of either type, then it can be broken down into different modes of use, each having a valid description of one or the other type. That, at least, is the methodology this paper adopts and illustrates, taking switch reference in Mbyá as a case in point.

2.2 Marked and unmarked modes of use

In this paper it is claimed not only that Mbyá switch reference has different modes of use requiring different kinds of descriptions, but that one mode of use is unmarked, while the rest are marked. Here, the unmarked option is considered to be that one which is least conditioned. Of the kinds of factors that might condition a given phenomenon, we can say (other things being equal) that internal factors provide less conditioning than external factors, since internal factors are closer to the phenomenon at hand. Thus, for a (morpho)syntactic phenomenon like switch reference, a mode of use having an internal (syntactic, grammatical) description should probably be considered the unmarked one, while modes of use requiring external (extrasyntactic, semantic or pragmatic) descriptions should be considered as marked.

Consider switch reference with the following two modes of use:

(a) signalling difference vs sameness of grammatical subject;
(b) signalling difference vs sameness of topic (a pragmatic role) or agent (a semantic role).

According to the above, we would consider (a) the unmarked mode of use, particularly if (b) were relatively infrequent. This is what we find in Mbyá (though the picture is presented in a somewhat oversimplified form at this point): there is an unmarked mode of use that has an internal (grammatical) description, and a marked mode of use that requires an external (extragrammatical) description.

2.3 On-call phenomena and fair-weather phenomena

Consider now phenomena of the type just described: those with a marked mode of use requiring external description. What is the origin of the conditioning for this marked use? Again making recourse to Hyman's terminology, this conditioning may arise either from substance or from form. In syntax, "substance is pragmatics, i.e. intrinsic properties of communication", whereas form refers to the syntax itself (p. 71).

If the conditioning arises from the substance -- if, for instance, there are strong semantic or pragmatic conditions in the context which lead the speaker to lay aside the unmarked use in favor of the marked one -- then we have what we might think of as an ON-CALL PHENOMENON: it stays within its unmarked use until it is called upon, because of the substance of communication, to manifest a marked one. If, however, the conditioning for the marked use arises from the form -- for example, if at a certain point complexities arise in assessing whether the proper (morpho)syntactic conditions hold for the unmarked use -- then we can think of the phenomenon as a FAIR-WEATHER PHENOMENON: intuitively, it stays with the unmarked usage unless that course becomes too difficult.

Both kinds of phenomenon are found in Mbyá, and perhaps in many other languages as well. The positioning of certain kinds of particles within the sentence is an on-call phenomenon: they have an unmarked, grammatically-determined position in the verb phrase or at the end of the sentence, but the speaker may choose to place them instead "in the cracks" between pragmatic constituents, to help bring out the pragmatic structuring of the utterance (Dooley 1982 and to appear). By contrast, as will be shown in this paper, Mbyá switch reference is a fair-weather phenomenon: it only departs from the signalling of grammatical information when that course involves a high degree of complexity.

3 SIGNALLING GRAMMATICAL SUBJECT: STRAIGHTFORWARD CASES

The analysis set forth in this paper, then, is that switch-reference marking in Mbyá requires different kinds of descriptions for different modes of use. There is an unmarked use, which can be described in grammatical terms: the signalling of same or different grammatical subject. There are also different modes of marked use, requiring certain kinds of extragrammatical information in their description. At this point, after introducing the switch reference markers, I consider some examples of their unmarked use.

3.1 Switch reference markers

Mbyá switch-reference markers are a type of subordinating conjunction; all such conjunctions are enclitic to the subordinate clause:[2]

(1) **vy** 'same subject'
[Ava o-o **vy**] mboi o-exa.
man 3-go **SS** snake 3-see
'When the man went, he saw the snake.'

(2) **ramo** 'different subject'
[Ava o-o **ramo**] mboi o-exa.
man 3-go **DS** snake 3-see
'When the man went, the snake saw him.'

The contraction **rã** is sometimes used in place of **ramo**.[3] Compare 3 with 2:

(3) **rã** 'different subject' (contraction of **ramo**)
[Ava o-o **rã**] mboi o-exa.
man 3-go **DS** snake 3-see
'When the man went, the snake saw him.'

In the above examples, the marking clauses appear in brackets; this practice will be followed throughout the paper. The marking clause can occur either before or after its reference clause. Compare 1', 2', and 3' with 1, 2, and 3 respectively:

(1') Ava o-exa mboi [o-o **vy**].
man 3-see snake 3-go **SS**
'The man saw the snake when he went.'

(2') Mboi o-exa ava [o-o **ramo**].
snake 3-see man 3-go **DS**
'The snake saw the man when he [the man] went.'

(3') Mboi o-exa ava [o-o **rã**].
snake 3-see man 3-go **DS**
'The snake saw the man when he [the man] went.'

Two types of elements sometimes occur after the switch reference markers, but are included within the brackets as part of the marking clause. The first type consists of modifiers to the clause as a whole, as in 4:

(4) Yvytu [oky **vy** e'ỹ].
wind rain **SS** NEG
'The wind blew, but not because of rain.'

In 4, **e'ỹ** 'negative' modifies the subordinate clause **oky vy** 'because of rain', or rather modifies the semantic relation holding between that clause and the main clause. Another such modifier is **ae** 'exactly, only'.

The second kind of element occurring after the switch-reference marker but within the brackets is a constituent (or the second part of a discontinuous construction) of the clause. It is typically a "heavy" expression:

(5) Apy i-kuai va'e ae t-o-mombe'u
here 3-be:PL REL exactly OPT-3-tell

o-i-kuaa ri **vy** xee a-j-apo vai-a-gue.
3-3-know COND **SS** 1SG 1SG-3-make bad-NR-PAST

'Let the very persons that are here tell what I have done wrong, if they know of such' (Acts 24.20).

In 5, **xee ajapo vaiague** 'what I have done wrong', though occurring after the SS marking, is the direct object of the verb **oikuaa** 'they know' in the marking clause.[4]

3.2 Subject, agent, and topic

In this section I establish the fact that in its primary or unmarked use, Mbyá switch reference is used to signal grammatical subject as opposed to the semantic category of agent or the pragmatic category of topic. For that reason, we will consider first agent, then topic, in relation to switch-reference marking.

3.2.1 Subject vs agent. By AGENT, I am referring to the initiator and controller of the action of the clause, when such exists. In the great majority of cases in Mbyá, agent is encoded as grammatical subject (Mbyá has no passive). With the optative prefix t-, however, the agent and the subject are potentially distinct. That is the case in example 6:

(6) Pe-juka e'ỹ teĩ tove t-o-mano ha'e ae.
2PL-kill NEG ADVER OPT **OPT**-3-die 3:ANA exactly
'Without your (pl.) killing him, let him die all by himself.'

The grammatical subject in the optative verbal construction **(tove) tomano** 'let him die' is third person, as is indicated by the subject prefix **o-** '3'. The agent, however, is second person plural, the same as the subject and agent of **pejuka** 'kill'. In Mbyá, the optative can be characterized by comparing it to "straight" imperatives, which are signalled by a distinctive set of person prefixes. Like imperatives, optatives encode the speaker's will or desire. But whereas in imperatives the grammatical subject is the same as the agent and is second person (singular or plural), in optatives either the subject or the agent, or both, are different from the second person. In this sense, the optative can be considered to be a type of skewed imperative. In 6, for example, the agent is second person (plural), but the grammatical subject is third person.

Example 7 below gives the full sentence from natural text in which 6 occurred:[8]

(7) Pe-juka e'ỹ teĩ tove t-o-mano ha'e ae
2PL-kill NEG ADVER OPT **OPT**-3-die 3:ANA exactly

[o-karu e'ỹ **vy**].
3-eat NEG **SS**

'Without your (pl.) killing him, let him die all by himself, just from not eating' (T24.105).

In 7, the optative construction is followed by the clause **okaru e'ỹ vy** 'from his not eating' which has third person subject and SS marking. Thus, the switch-reference marking in 7 indicates that the grammatical subjects of the two clauses involved are the same; it does not indicate anything in regard to the agents.

An additional example of the same type is provided by 8 (repeated from 5:)

(8) Apy i-kuai va'e ae t-o-mombe'u
here 3-be:PL REL exactly **OPT**-3-tell

[o-i-kuaa ri **vy** xee a-j-apo vai-a-gue].
3-3-know COND **SS** 1SG 1SG-3-make bad-NR-PAST

'Let the very persons that are here tell what I
have done wrong, if they know of such' (Acts 24.20).

8 is part of the Apostle Paul's defense before Felix. In this example as in 7, the SS marking indicates sameness of grammatical subject rather than anything to do with agent. (The agent of the optative construction 'tell' is Felix, whom Paul was addressing.) The above examples therefore illustrate the typical, primary, unmarked use of switch-reference marking in Mbyá, in signalling sameness or difference in the grammatical subject referents of the two clauses in question.

3.2.2 Subject vs topic. What has just been illustrated for semantic agent is true as well for the pragmatic notion of topic. By TOPIC, I am thinking specifically of sentence topic as opposed to discourse-level topic (Reinhart 1982); sentence topic is the type that is prominent referentially and syntactically in a given sentence. Sentence topics in Mbyá are often manifested both by fronting and by the occurrence of particles "in the crack" between the fronted constituent and the remainder of the sentence (Dooley 1982:323ff). Both of these indicators can be seen in 9:

(9) Compadre Galdino ma a-exa Roberto r-o py.
godfather Galdino BDY 1SG-see Robert EP-house in
'Compadre Galdino, I saw at Roberto's house.'

In 9, the direct object **compadre Galdino** occurs initially in the sentence rather than in its more neutral position following the verb, the basic word order being SVO (ibid.). Further, this constituent is set off from the rest of the sentence by the boundary particle **ma** which occurs between pragmatic constituents as a type of segmental realization of pause (Dooley 1977, 1982). Thus, **compadre Galdino** is indicated as sentence topic in 9.

9 is part of a text-initial sentence, the full text of which is given as 10:

(10) [Compadre Galdino ma a-exa Roberto r-o py
godfather Galdino BDY 1SG-see Robert EP-house in

ramo] ma gu-a'y-'i o-mombe'u.
DS BDY 3:REFL-son-DIMIN 3-tell

'Compadre Galdino, when I saw him at Roberto's house, talked about his little son' (T83.2).

Compadre Galdino, after being indicated as sentence topic in the initial clause of 10, continues to be referred to in the remaining clause ('talked about his little son') as subject and NP possessor. This continuity of reference is typical of sentence topics. In 10, then, the topic does not undergo a change between clauses. The DS switch-reference marker, therefore, relates to the grammatical subjects of the two clauses rather than to the topics.

A further example of this type is 11:

(11) [Elefante ma ja-exa **ramo**] 0-tuvixa.
elephant BDY 1+2-see **DS** 3-huge
'An elephant is huge to look at' (lit., 'When we see elephant, it is huge').

In 9, **elefante** is the sentence topic throughout both clauses. Since there is no discontinuity of topic, the DS switch-reference marking relates to grammatical subject.

3.3 Subject sets

In order to deal more exactly with complexities of subject reference, we introduce the notion of SUBJECT SETS. If we think of the grammatical subject of the marking clause as defining one set of referents and that of the reference clause as defining another, the straightforward cases for switch reference occur when the two subject sets are nonempty and either completely disjoint (containing no members in common) or equal (both containing exactly the same members, not simply the same number of members). Examples 2, 3, 10, and 11 show DS marking for nonempty and disjoint subject sets, while 1, 7, and 8 show SS marking for nonempty equal subject sets.

Throughout the paper, strategies for switch-reference marking in Mbyá will be presented by successive approximations. The first of these is given as 12:

(12) MBYA SWITCH-REFERENCE MARKING: STRAIGHTFORWARD CASES

1. When the subject sets are equal and nonempty, SS occurs.
2. When the subject sets are disjoint and nonempty, DS occurs.

The final version of the switch-reference rule is given later as 44.

The straightforward cases covered in 12 account for the vast majority -- over 98% -- of switch-reference constructions in Mbyá. Complexities are of the following three types: partial overlap of the two subject sets, empty subject sets, and syntactic complexity of different kinds. These complexities are dealt with in subsequent sections. In each case, it is not a random type of complexity that triggers a marked use of switch reference in Mbyá, but rather one that complicates the comparison of the two subject sets, making difficult a speaker judgment as to whether the subject sets are the same or different.

4 STRICT INCLUSION OF NONEMPTY SUBJECT SETS

As just mentioned, the most straightforward cases for switch reference involve subject sets that are nonempty and either disjoint or equal. The only other alternative is for the two subject sets to be partially overlapping, having some but not all members in common. Partial overlap gives rise to a common type of indeterminacy for same-vs-different dichotomies.

In the corpus, all examples of partially overlapping subject sets in switch-reference constructions are of the strict inclusion type, in which one set is wholly contained in the other but is not equal to it.

The present section examines switch-reference constructions with strict inclusion holding between the subject sets. In Mbyá, the grammar manages to salvage a part of this domain for its own, but for the rest, switch-reference marking goes over to the semantico-pragmatic camp.

4.1 Strict inclusion with different grammatical person

Example 13 illustrates a switch-reference construction with strict inclusion of nonempty subject sets:

(13) [Pe-ro-via e'ỹ **rã**] ja-je'oi-pa tema.
2SG-COM-believe NEG **DS** 1+2-go:PL-all persistently
'If you don't believe it, let's all go [and see]' (T10.87).

In 13, the subjects of the two clauses involve different grammatical person: 2PL in **perovia e'ỹ** 'you don't believe it' and 1+2, the first person plural inclusive, in **jaje'oipa tema** 'let's all go'. When grammatical person is different with strict inclusion, DS marking occurs.

In 13, it is the predicate 'let's all go' of the reference clause that has the larger subject set. In 14, the set inclusion is in the other direction, with the subject set of the marking clause strictly included in that of the reference clause:

(14) [Takua r-uxu ty guy py oro-exa **ramo**]
bamboo EP-huge COLL base in 1+3-see **DS**

nd-a-juka-i yvyra py.
NEG-1SG-kill-NEG wood INSTR

'Since we saw [the snake] in the bottom of a stand of bamboo, I wasn't able to kill it with a stick' (T71.4).

Furthermore, in 14 the grammatical persons are different than in 13: 1+3 (first person plural exclusive) and 1SG. What the two examples have in common is that DS marking occurs. As a matter of fact, that is the case in all such examples that have been found in the corpus: when in a switch-reference construction the subject sets are in a strict inclusion relationship, then DS marking occurs if they involve different grammatical person.

Change of grammatical person without strict inclusion of subject sets is not sufficient in order to condition DS marking. Consider 15:

(15)

[[Amo-gue	ja-je-ro-via	ete	va'e-kue
NSPEC-COLL	1+2-REFL-COM-believe	really	REL-PAST

ri	**vy**]	tema	nhane-nhe'ẽ	rei	**vy**]
COND	**SS**	persistently	1+2-sound	badly	**SS**

o-o	va'e-rã	ng-uu	ete	amba	py.
3-go	REL-FUT	3:REFL-father	really	divine:home	in

'If there are some of us who have really believed and thus keep on crying out, they will get to our true father's home' (T12.342).

In 15, the subject set consists of 'some of us' (**amogue** 'some' along with 1+2 subject marking), a category having elements of both first plural inclusive and third person. This subject set is constant through the three clauses of 15, but the grammatical person changes from 1+2 ('some of us') in the first two clauses to 3 ('they') in the final clause. The SS marking, which occurs twice, reflects the sameness of the subject sets rather than the change of grammatical person; it is covered by rule 1 of (12): When the subject sets are equal and nonempty, SS occurs. This example clearly points out that rule 1 has to do with identity of reference rather than identity of grammatical features.

4.2 Strict inclusion with same grammatical person

In this section we examine cases of strict inclusion of subject sets with the same grammatical person (i.e., both clauses have third person subject). Consider 16:

(16)

[Xivi	o-o	t-ape	r-upi	**vy**]
jaguar	3-go	NPOSSD-path	EP-along	**SS**

nh-ovaexĩ ka'i reve.
RECIP-meet monkey with

'When the jaguar was going along the path, he met up with the monkey' (T15.1).

In the second (reference) clause of 16, the verb **nhovaexĩ** contains the reciprocal prefix **nh-** (a variant of **jo-** or **nho-**), which by itself has the gloss 'they [the jaguar and the monkey] met up with one another'. This clause is an instance of what Schwartz (1988) calls verb-coded coordination. Another example would be:

(17) Ja-a ke xe-reve.
1+2-go polite:request 1SG-with
'Let's go together' (lit., 'Let's go with me').

An example from Chilean Spanish is:

(18) Fuimos al cine con mi madre.
'My mother and I went to the cinema' (lit., 'We went to the cinema with my mother') (Schartz 1988:54).

Thus, although verb-coded coordination need not include the reciprocal morpheme as in 16, "the predicates generally tend to involve reciprocal or mutual activities or motion" (Schwartz 1988:69). Pre- or postpositional phrases commonly found in verb-coded coordination often have a pre- or postposition with a comitative meaning (Spanish **con**, Mbyá **reve** 'with') (pp. 55, 64). Hence in 16, the fact that the second clause contains **ka'i reve** 'with the monkey' does not alter the fact that the subject set consists of both the jaguar and the monkey, although the postpositional phrase does seem to establish the jaguar as the leading participant in some sense. The SS marking in 16 is, as we shall see, a reflection of the fact that the two clauses of 16 have the same leading participant.

Compare 16 with 19:

(19) [["T-uu kuery ko o-u je-kuaa ma
3-father COLL opinion 3-come REFL-know already

voi," he-'i **ramo**] o-py gui ha'e javi-ve
early 3-say **DS** house-in from 3:ANA all-more

o-ẽ **vy**] o-nha-mba o-je'oi-vy.
3-go:out **SS** 3-run-all 3-go:PL-SER

'When he said "I see his parents coming!" they all got outside and ran off' (T24.34).

Example 19, like 16, begins with a marking clause ("..." he'i 'he said') with a one-participant subject, followed by a reference clause (**opy gui ha'e javive oẽ** 'they all got outside') whose subject set strictly includes that of the marking clause. However, whereas 16 has SS marking between the two clauses, 19 has DS. Note that in 19, the subject of the first clause 'he said' does not continue as leading participant in the second and following clauses; there is a change of leading participant from 'he' to 'they all'.

Now let us reverse the order of containment and see examples in which the first clause in the switch-reference construction has the larger subject set:

(20)	[[I-jypy	jo-e	irũ	va'e-kue	vy
	3-beginning	RECIP-ABL	3:companion	REL-PAST	**SS**

ae]	jagua	o-exa	teĩ	ka'i	ka'aguy	r-e	vy]
exactly	dog	3-see	ADVER	monkey	woods	EP-ABL	**SS**

amo-gue	jagua	n-o-nhe'ẽ-i	va'e	ka'i	r-e.
NSPEC-COLL	dog	NEG-3-sound-NEG	REL	monkey	EP-ABL

'Since they [the dog and the monkey] had been companions in the beginning, some dogs, even when they see a monkey in the woods, will not bark at him' (T15.94).

(21)	Ha'e	rire	[jo-guer-aa	ma	t-ape
	3:ANA	after	RECIP-COM-go	already	NPOSSD-path

r-upi	**ramo**]	ka'i	jagua	pe	aipo-e-'i,	"..."
EP-along	**DS**	monkey	dog	DAT	ATTN-3-say	

'After that, as they [the dog and the monkey] were going along with each other along the road, the monkey said to the dog, "..."' (T15.55).

In both 20 and 21 the first clause has a plural subject set (dog and monkey), as seen from the reciprocal morphemes that occur. Further, in each case the second clause has only one of these participants as its subject. In both examples the first clause is a marking clause and the second is the reference clause of the first. 20, however, has SS marking, whereas 21 has DS. The explanation seems to be along the same lines as above. 21 is a paragraph-initial sentence, as indicated by its initial phrasal conjunction ha'e rire 'after that' (Dooley 1986:57ff), and no leading participant is assumed from preceding material; it must be explicitly established. This is exactly what happens in the second clause, as **ka'i** 'monkey' initiates the conversation. That is to say, in 21 it would not be correct to say that the two clauses have the same leading participant. Example 20, however, is the second sentence in its paragraph, and in fact is a restatement of the first sentence, whose translation runs as follows: 'As a result of that [incident], right up to the present time when a dog sees a monkey in the woods, some won't bark at them.' That is, the paragraph is about dogs and what they will do when they see a monkey. Since 'dog' is included in the subject set of the first clause of 20 (**ijypy joe irũ va'ekue** 'they had been companions in the beginning'), it seems reasonable to interpret the SS marking on that clause as indicating a continuity of the leading participant.

Let us consider one further example, one which is similar to 16, but whose reference clause precedes the marking clause:

(22) Ha'e rire je ka'i xivi pe aipo-e-'i jevy
3:ANA after HSY monkey jaguar DAT thus-3-say again

[jo-guer-aa jevy ma **vy**], "..."
RECIP-COM-go again already **SS**

'After that, the monkey again said to the jaguar
while they were going along with each other,
"You go that way. I'll go this way"' (T15.18).

In the first clause of 22, **ka'i xivi pe aipoe'i jevy** 'the monkey again said to the jaguar', the monkey is established as the leading participant. Even though the second clause **jogueraa jevy ma** 'they were going along with each other' with its reciprocal prefix **jo-** is formally symmetrical in regard to which participant is taking the initiative, the SS marking can well be interpreted to mean that the monkey continues as the leading participant; the content of the monkey's speech that is furnished in the free translation of 22 ('You go that way. I'll go this way.') illustrates what is true throughout most of the story: the monkey is the one who is making things happen.

4.3 Agent/topic

In discussing the examples in section 4.2, I have used the term "leading participant" in an intuitive sense. Such a participant seems to be identifiable by some combination of agent and topic properties, the salient features varying from context to context. In what follows, I will refer to such a subject referent as an agent/topic. In this section I have tried to illustrate, by means of successive examples, that in switch-reference constructions in which the subject sets are nonempty and show both strict inclusion and the same grammatical person, the switch-reference marking indicates whether or not the participants represented by the smaller subject set should be considered as agent/topic in both clauses.

With that in mind, the rules for Mbyá switch reference can be updated as follows to cover all cases of nonempty subject sets:

(23) MBYA SWITCH-REFERENCE MARKING: NONEMPTY SUBJECT SETS

1. When the subject sets are equal and nonempty, SS occurs.
2. When the subject sets are disjoint and nonempty, DS occurs.
3. When the subject sets are nonempty with strict inclusion, and
    a. the subjects have different grammatical person, DS occurs.
    b. the subjects have the same grammatical person, and if
        i. the clauses are presented as having the same agent/topic, SS occurs;*
        ii. otherwise, DS occurs.*

* involves a semantic or pragmatic condition beyond subject reference per se

Since agent/topic is a semantico-pragmatic notion that goes beyond subject reference per se, condition 3b in 23 represents the first marked use of Mbyá switch reference that we have considered in this paper.

5 EMPTY SUBJECT SETS

Up to this point we have not considered empty subject sets. An empty subject set is automatically disjoint from any other set and strictly included in any nonempty set, and any two empty subject sets are equal. Even though we can use these set-theoretical terms to describe them, empty subject sets do not follow the same rules for switch-reference marking that nonempty sets do.

In this section we will first make a brief survey of the types of empty subject clauses that are found in Mbyá. Then we consider the relatively simple case of when just one of the subject sets is empty, and finally what happens when both subject sets are empty.

5.1 Impersonal, temporal, and ambient clauses

In investigating Mbyá switch reference, it is useful to distinguish three types of empty subject clauses: impersonal, temporal, and ambient clauses.

Impersonal clauses in Mbyá are indicated by the verbal suffix **-a** 'impersonal', which co-occurs only with third-person subject marking.

(24) Avaxi o-guer-u-pa-a o-py.
corn 3-COM-come-all-**IMPERS** house-in
'The corn was all brought inside.'

The impersonal suffix in Mbyá blocks any act of reference to a grammatical subject; no other (overt) argument is promoted to subject, and the (logical) subject is never expressed by means of an oblique phrase. As in certain other languages, impersonal clauses occur not only with transitive verbs, as in 24, but also with intransitive ones (cf. Comrie 1977):

(25) Ava-ve rei nd-o-u-a-i.
man-none badly NEG-3-come-**IMPERS**-NEG
'No one at all came.'

In 25, the impersonal clause occurs with the intransitive stem **u** 'come', whereas in 24 it occurs with the transitive stem **gueru** 'bring' which is derived from the same root.

The second type of empty-subject clauses are clauses consisting of only a predicate which is a noninflected word, usually a noun, adjective, or adverb. (Actually I am concerned here with the phrasal counterparts of these categories, but in most cases only a single word is involved.) Clauses consisting of noninflected words are of the two major types, temporal clauses and ambient clauses.

Temporal clauses involve words such as **ka'aru** 'afternoon', **are** 'a long time', and **ko'ẽ** 'dawn', as well as partial borrowings from the Portuguese such as **quatro hora jave** 'at four o'clock'. Such words may occur alone, as in 26:

(26) Ka'aru.
afternoon
'It's late.'

Or, they may take modifiers of different types:

(27) Ka'aru porã.
afternoon well
'It's a nice afternoon.'

(28) Ka'aru ma.
afternoon already.
'It's already getting late.'

Ambient clauses concern meteorological phenomena and involve words such as **yvytur** 'wind', **okyr** 'rain', **arair** 'cloud', **overar** 'lightning', **yapur** 'thunder', and **pytũ** 'darkness'. Just as in temporal clauses, ambient words may either occur singly or with modifiers, as in 29:

(29) Kuee arai-pa.
yesterday cloud-all
'Yesterday it was completely cloudy.'

5.2 Only one empty subject set

Since impersonal clauses have empty subject sets, they always show DS marking with respect to clauses with nonempty subject:

(30) Aỹ ma aje'i-ve gua-re a-mombe'u ta,
now BDY ET-more NR-PAST 1SG-tell about:to

[aỹ o-vaẽ-a rã] nde-ayvu aguã.
now 3-arrive-**IMPERS** **DS** 2SG-speech PURP

'Now I'm going to tell about what we were
talking about before, so that now when someone
arrives you will know how to speak to them' (T78.1).

Example 30 was spoken to me by one of my Mbyá tutors who had observed deficiencies in my (cultural practice of) hospitality, and was trying to teach me how to be a good host. The first clause is the main clause; the second and third ones (in the second line) involve a switch-reference construction embedded in a purpose clause. The second (marking) clause **aỹ ovaẽa** 'now (someone) arrives' has empty subject reference, and the third (reference) clause has a nonempty (second person singular) subject. The switch-reference marking is DS.

This illustrates the following rule: whenever only one clause in a switch-reference construction has an empty subject, DS marking occurs. In example 31 this is illustrated with a temporal clause:

(31) [Ko'ẽ rã] ja-juka va'e-rã uru.
dawn **DS** 1+2-kill REL-FUT chicken
'Tomorrow we will kill a chicken.'

In sentences such as 31, the expression **ko'ẽ rã** 'dawn DS' is lexicalized to mean 'tomorrow'. In 31, DS marking is found with an ambient clause:

(32) [Oky **ramo**] ava-ve rei nd-o-o-i.
rain **DS** man-none badly NEG-3-go-NEG
'Since it was raining, no one went.'

5.3 Two empty subject sets

When both subject sets are empty, as has been mentioned, they are at the same time disjoint and equal. This makes for predictable complications when 12 is the basic rule. It is also an atypical situation linguistically. We consider the following two main cases: (i) when both clauses are of the same semantic type (impersonal, temporal, or ambient); and (ii) when the clauses are of mixed types.

5.3.1 Clauses of the same semantic type. First, we examine examples of switch-reference constructions in which two empty subject clauses are of the same semantic type. When two impersonal clauses occur together in a coordinate or subordinate construction, the suffix **-a** 'impersonal' need not be present in both. Example 33 is of this type:

(33) O-mombe'u-a va'e-rã ha'e o-j-apo va'e-kue
3-tell-IMPERS REL-FUT 3:ANA 3-3-make REL-PAST

[hexe i-ma'endu'a **vy**].
3:ABS 3-remember **SS**

'(They) will tell what she has done, remembering her' (Mark 14.9).

Both clauses in 33 are interpreted as having empty subjects.

Two temporal clauses have not been found in a switch-reference construction, but 34 (repeated from 4) shows two ambient clauses:

(34) Yvytu [oky **vy** e'ỹ].
wind rain **SS** NEG
'The wind blew, but not because of rain.'

35 also has two ambient clauses:

(35) Arai vaipa, [oky-xe **vy**].
cloud much rain-want **SS**
'It's very cloudy, since it's wanting to rain.'

Examples such as the above illustrate the rule that, for two empty-subject clauses of the same semantic type, SS marking occurs.*

5.3.2 Clauses of mixed types. The following sentences show switch-reference constructions with mixed types of empty-subject clauses. Example 36 has an ambient clause followed by an impersonal clause:

(36) [Oky **rã**] nd-o-u-a-i.
rain **DS** NEG-3-come-IMPERS-NEG
'When it rains, no one comes.'

37 shows a temporal and an impersonal clause:

(37) [Ko'ẽ **rã**] nd-o-u-a-i 'rã ava-ve rei.
dawn **DS** NEG-3-come-IMPERS-NEG FUT man-more badly
'Tomorrow no one at all will come.'

And 38 shows a temporal clause and an ambient clause:

(38) [Ko'ẽ **rã**] arai-pa va'e-rã.
dawn **DS** cloud-all REL-FUT
'Tomorrow it will be all cloudy.'

In these constructions with mixed types of empty-subject clauses, DS marking is found. With two empty subject sets, therefore, switch reference signals a semantic fact that does not have to do with grammatical subject per se: namely, whether the clauses have the same or different semantic type.

The description of switch reference up to this point can therefore be given as follows:

(39) MBYA SWITCH-REFERENCE MARKING: PREFINAL VERSION

1. When the subject sets are equal and nonempty, SS occurs.
2. When the subject sets are disjoint and nonempty, DS occurs.
3. When the subject sets are nonempty with strict inclusion, and
   a. the subjects have different grammatical person, DS occurs.
   b. the subjects have the same grammatical person, and if
      i. the clauses are presented as having the same agent/topic, SS occurs;*
      ii. otherwise, DS occurs.*
4. When one of the subject sets is empty
   a. but the other is nonempty, DS occurs;
   b. and the other is empty as well, and if
      i. the clauses are of the same semantic type (either impersonal, temporal, or ambient), SS occurs;*
      ii. the clauses are of mixed semantic types, DS occurs.*

* involves a semantic or pragmatic condition beyond subject reference per se

6 RESIDUAL FACTORS

There remain a few disquieting examples. A brief survey is instructive in suggesting possible factors other than those that we have considered thus far.

(40) [Ita ova o-ĩ-a py o-vaẽ o-je'oi-vy
stone face 3-be:located-NR in 3-arrive 3-go:PL-SER

ramo] mba'e-ve rei nd-o-exa-i.
DS thing-more badly NEG-3-see-NEG

'When they all arrived where the stone bluff was, they didn't see a thing' (T11.143).

In 40, the two clauses have coreferential subjects and involve no particular complexity of the types we have been considering, yet DS occurs. It seems likely that a genuine performance error is involved. This is a written text by a new writer, and did not undergo editing. An error is understandable in view of the fact that there is more than one common way to narrate a perception event of this type: the above is one way, with the second clause having a verb of seeing; a second way would have a verb of existence in the second clause ('not a thing was there'). It is not at all unusual, especially for new writers, to finish a sentence in a different way than they began it. An existence verb in the second clause ('there was nothing') would of course require DS marking.

A second type of residue is presented in 41:

(41) [Xee ri xe-r-eka **vy**] ma
1SG RESP 1SG-EP-seek **SS** BDY

tove ko-va'e kuery t-o-je'oi-pa.
OPT D1-REL COLL OPT-3-go:PL-all

'If it's me you are seeking, may all these go' (John 18.8).

This example is from the Mbyá New Testament, consisting of Jesus's words to the guards who arrested him. The subject of the first clause is second person plural (when the object marking is first person, subject marking does not occur), and the second clause is optative with third person plural subject, albeit with second person plural agent. Therefore, according to the discussion in Sect. 3.2.1, we should expect DS marking instead of the SS that occurs. This example, unlike 40, has been checked by experienced Mbyá editors and is not likely to be a performance error. It appears here that the switch reference is signalling continuity of agent, but the reason for this is not clear. It is true that the referential complexity in 41 is considerable: in addition to the optative in the second clause separating the grammatical subject from the agent, there is the fact that the participants include first person singular (Jesus), second person plural (the guards), and third person plural (the disciples). It is an open question at this point whether the agent/topic mode of switch reference can be optionally triggered by referential complexity of diverse kinds, not just by strictly included or empty subject sets.

Two final examples will be discussed together:

(42) [Nhande-r-u-ete o-me'ẽ va'e-kue vy 'rã-e]
1+2-EP-father-real 3-give REL-PAST SS FUT-exactly

ja-r-eko.
1+2-COM-live

'It's only when [something] is what our true father has given that we have it' (John 3.27).

(43) [Nhande ae nha-nho-tỹ va'e-kue-'i vy
1+2 exactly 1+2-TR-plant REL-PAST-DIMIN SS

ae] ja-'u-xe-a-'i rami ja-'u.
exactly 1+2-eat-want-NR-DIMIN like 1+2-eat

'Only if [what we have to eat] is what we ourselves have planted, will we be able to eat it in a way that satisfies our appetite' (lit., 'like we want to eat it') (T76.13).

Both 42 and 43 involve disjoint subject sets and SS marking. In both, the first (marking) clause is nominalized on its direct object (the nominalizer, inflected for past tense, is **va'ekue**): 'what our true father has given' in 42, and 'what we ourselves have planted' in 43. These referents are the grammatical subject of the first clauses in their respective examples, and occur as well as direct object of the second (reference) clauses. In both examples, it appears that the switch-reference marking signals continuity of topic rather than difference in subjects. As in 41, the two above examples are rather rich in reference: both examples have 1+2 as well as the same direct object in both clauses. So the same question is raised, as to whether referential complexity can here be triggering the marked use of switch reference in signalling agent/topic. A related question here is whether the syntactic complexity of nominalization enters in, since this device changes the direct object of the first clause in each case to the grammatical subject.

There is little that we can conclude from such examples, since they are so rare in occurrence (the four above are gleaned from more than 3000 switch-reference constructions). But they do seem to illustrate the following, which relates not only to switch reference but to other kinds of primarily grammatical phenomena as well. Once we get beyond the kind of grammatical rule that holds for the great majority of cases and into factors having to do with discourse, pragmatics, and sentence processing, we are in an open-ended situation where it is not always possible -- and in principle should not be possible -- to explain all cases by means of rule. It is the nature of grammar to govern the vast majority of cases by recourse to a bare minimum of factors; the few cases that remain outside grammar are open to the impact of whatever extragrammatical factors there are. So although the effects may not always be predictable by rule, they should have plausible post hoc external explanations.

The analysis of switch-reference marking adopted in this paper, then, is given in 44:

(44) MBYA SWITCH-REFERENCE MARKING

1. When the subject sets are equal and nonempty, SS occurs.
2. When the subject sets are disjoint and nonempty, DS occurs.
3. When the subject sets are nonempty with strict inclusion, and
   a. the subjects have different grammatical person, DS occurs.
   b. the subjects have the same grammatical person, and if
      i. the clauses are presented as having the same agent/topic, SS occurs;*
      ii. otherwise, DS occurs.*
4. When one of the subject sets is empty
   a. but the other is nonempty, DS occurs;
   b. and the other is empty as well, and if
      i. the clauses are of the same semantic type (impersonal, temporal, or ambient), SS occurs;*
      ii. the clauses are of mixed semantic types, DS occurs.*
5. There are likely residual factors that trigger other signalling of agent/topic.*

* involves a semantic or pragmatic condition beyond subject reference per se

7 CONCLUDING REMARKS

In this paper I have surveyed switch reference in Mbyá Guarani. The great majority of cases can be covered by a grammatical rule stated in terms of the grammatical subjects of the two clauses involved, yielding 'same subject' or 'different subject' markers. In sentences where this subject-related dichotomy is complex, switch-reference marking can instead be used to indicate facts of a semantic or pragmatic nature, such as whether the two clauses have the same agent/topic or the same semantic type. These are considered marked uses of Mbyá switch reference. Certain aspects of these uses can be described by rules similar to grammatical ones, but the description is essentially of the external variety, depending on factors outside the formal system.

Mbyá switch reference is therefore one example of linguistic phenomena that are conditioned by grammatical features and are amenable to description by grammatical rule, but only in the unmarked case. In marked modes of use, they are conditioned by extragrammatical factors. More specifically, we have seen that Mbyá switch reference is a "fair-weather phenomenon", one whose marked uses are triggered by complexities that arise with its unmarked use. In this division of labor, grammar covers as many cases as it can, subject to some law of diminishing returns.

Two questions arise in connection with the type of description represented by this paper. First, how common are phenomena that require a mix of internal and external descriptions? It is a common experience that even one's best analyses turn out to have a bit of residue, and this residue may be symptomatic of such a mix. Even though it may account for only a small percentage of the data, it may have an importance out of proportion to its frequency if we are interested in the interaction of grammatical and extragrammatical factors and the "limits and possibilities of grammatical theory" (cf. the title of Newmeyer 1983).

A second question arises: Does the existence of fair-weather phenomena like Mbyá switch reference mean that there could be limits to the complexity of entry conditions for grammatical rules? Given a broadly functional view of language, it would be surprising if any absolute, rigid limit existed; but it would be surprising as well if there were not some kind of variable limit imposed by practical conditions of language processing.

Notes

1. Mbyá is one of several dialects of Guarani, a language of the Tupi-Guarani family. It is spoken by a total of perhaps 7000 speakers in northern Argentina, southern Brazil, and eastern Paraguay. The present study is based on field work carried out from 1975 through 1988 at the Posto Indigena Rio das Cobras, Paraná, Brazil, under the auspices of the Summer Institute of Linguistics. The author wishes to acknowledge the helpful comments of Albert Bickford in the preparation of the manuscript; any errors, however, remain his own.

2. The transcription of Mbyá data in the present study is in the practical orthography. Mbyá has six vowels: i, ɨ (written y), u, e, a, and o. It has fourteen consonants: p, t, ś (written x), k, k^w (written ku), ? (glottal stop, written with an apostrophe), h, m (written mb preceding oral vowels), n (written nd preceding oral vowels), ɲ (written nh preceding nasal vowels and j preceding oral vowels), ŋ (written ng), ŋ^w (written gu), v, and r. Nasalization holds throughout a word whose final syllable is written either with a tilde or with one of the consonant symbols m n nh, and is also regressive from any of the consonants m n ng.

The following abbreviations are used in glosses throughout this paper:

ABL	ablative
ADVER	adversative
ANA	anaphora
ATTN	attention
BDY	boundary marker
COLL	collective
COM	comitative
COND	conditional
DAT	dative
DIMIN	diminutive
DS	different subject
D1	deictic of first person
EP	epenthesis
ET	earlier today
FUT	future
HSY	hearsay
IMP	imperative
IMPERS	impersonal
INSTR	instrumental
NEG	negative
NPOSSD	nonpossessed
NR	nominalizer
NSPEC	nonspecific
OPT	optative
PAST	past

PL	plural
PURP	purpose
RECIP	reciprocal
REFL	reflexive
REL	relativizer
RESP	response
SER	indicator of serial verb
SG	singular
SS	same subject
TR	transitivizer
1	first person
1+2	first person plural inclusive
1+3	first person plural exclusive
2	second person
3	third person

3. In Mbyá, contractions are conditioned by factors that often co-occur with contractions in other languages. They frequently occur in formulaic expressions such as **ko'ẽ rã** (dawn DS) 'the following day, tomorrow', and also when the speaker is evidencing curtness (for whatever reason) with the hearer.

4. Examples that are accompanied by text and line number are in texts that may be obtained from:

Summer Institute of Linguistics
SAI/No, Lote D, Bloco 3
70770 Brasilia, DF
Brazil

Ask for Mbyá Guarani texts of the desired number, or for the complete set.

5. In section 2.3, reference was made to certain particles in Mbyá which can occur "in the cracks" between constituents. One example is **ma**, glossed 'boundary (BDY)', since it has no other function. When such particles occur following a switch-reference clause, they are not bracketed with the clause.

6. There are a few instances of a negative plus SS marking used in a disjunctive construction. Observe the following:

Três hora jave e'ỹ vy ma quatro hora jave 'rã.
three hour during NEG SS BDY four hour during FUT
'If not at three o'clock, then at four [I will come]'
(T79.10).

Such examples are not included in the analysis of this paper.

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THE NAHUATL VERB maka
A COGNITIVE GRAMMAR ANALYSIS

David Tuggy

1 Introduction
2 Preliminary considerations
  2.1 Verbs, subjects and objects in CG
  2.2 Transitive and intransitive Nahuatl verb stems
  2.3 Nahuatl object prefixes
  2.4 Incorporated noun objects
3 Double-object constructions
4 Non-personal objects producing an intransitive stem
5 Non-personal objects producing a transitive stem
  5.1 Secondary objects
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6 The many meanings of mo-maa; kuā-maa
7 Summary and conclusion

1 INTRODUCTION

The verb stem **maka** 'give' in Nahuatl is unusual in its range of options with respect to transitivity.[1] Like all transitive verb stems, it regularly occurs with an object and in fact must do so, but it also appears in an unusually large number of constructions in which it has two objects. I would like to examine these constructions within the framework of Cognitive grammar (CG) (Langacker 1987).

2 PRELIMINARY CONSIDERATIONS

2.1 Verbs, subjects and objects in CG

Before beginning to examine the Nahuatl data we would do well to clarify how verbs and their subjects and objects are understood in CG.

Verbal concepts designate *processes*, *relations* whose evolution is tracked cognitively through time. As the name implies, relations designate cognitive interconnections which relate other entities. Invariably, one of the entities which are related is singled out as figure against the ground provided by the other entities: this salient entity is called the *Trajector* (you can think of it as a kind of "internal subject"). For instance, in **maka**, as in its English translation 'give', the giver is Trajector of the verbal concept. Commonly there are other salient entities, distinct from the Trajector, which are involved in the designated process, these are *landmarks* (or "internal objects" if you like). For **maka** the thing given and the person who receives it are landmarks. Commonly one landmark will stand out above the rest: this is often simply called the Landmark (with a capital "L"); for clarity's sake we will use the term *primary Landmark*. The other landmarks are thus *secondary landmarks*. For **maka** the person receiving what is given is the primary Landmark, and the thing given is secondary. **maka** is diagrammed in Figure 1.[2]

---

[1] The Nahuatl data correspond to the dialect spoken to the south of Orizaba, Veracruz. Orthographic symbols are used with their usual meanings, with the following provisos: **tl**, **tz**, **ch**, and **ku** are digraphs, representing [ƛ], [¢], [č], and [kʷ] respectively. **x** is [š] (English orthographic **sh**). Stress is penultimate unless marked (with an acute accent). Vowel length is elusive but not quite illusive (Burnham and Tuggy 1979); where it is marked it has been heard at least once.

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[2] In Figure 1 and subsequent diagrams the following conventions hold. Trajector and primary Landmark are labelled "Tr" and "Lm" (or "Primary Lm") respectively. Other landmarks are labelled "lm". Dotted lines represent *correspondences* or identity construals. Humans are represented by stick men, except for speaker and hearer, who are represented as S and H respectively. Other *Things* are represented by circles; a schematic relation by two circles joined by a dashed line. *Profiling* (designation) is indicated by boldfacing, secondary salience by lesser boldfacing. No indication is given of the *temporal profile* of verbal notions, since the contrast between processes and atemporal relations is not relevant here. In diagrams of the conception of giving, a double arrow represents causing the change (indicated by the single arrow) of the thing given from one person's sphere of possession to another's. In certain other diagrams (e.g. the diagrams of **mo-** reflexive in Figures 4-5) an arrow is used to represent a process, with the Trajector at the tail and the Landmark at the head of the arrow. Semantic structures are located in a "Semantic Space", and the phonological structures that symbolize them in a "Phonological Space", with the symbolization relation represented by a solid line crossing the boundary between the two spaces. For complex structures the composite structures are represented above the components, with solid lines representing the component-composite relationship. No attempt has been made to represent differences of entrenchment; e.g. the form **ni-mitz-tē-maka** and its component **mitz-tē-maka** (Figure 16) are presumably not established units, as their components **ni-**, **mitz-**, **tē-**, **maka**, and **tē-maka** are, but that difference is not reflected in the diagrams.

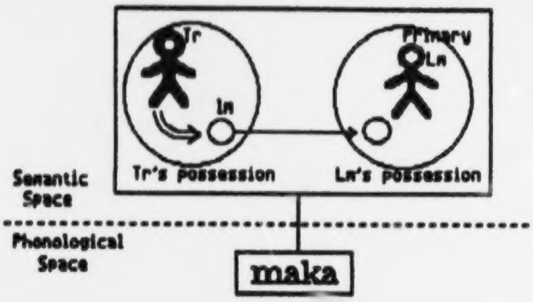

Figure 1
maka

It is important to note that the choice of Trajector and primary Landmark is not predictable in any direct way from the objective situation described by a verb, but rather is a matter of linguistic convention. The variations of prominence, of construing one entity as figure relative to others, which constitute the Trajector vs. landmark and primary vs. secondary landmark distinctions, are very much a matter of structure imposed on a situation rather than determined by it.[3] Giving can be relatively neutrally described as a situation in which a giver possesses something at one point in time, and then the giver causes that a recipient possess that thing. **maka** conventionally picks the giver as Trajector and the recipient as primary Landmark. The English verb **give** takes the giver as Trajector but the thing given as primary Landmark, and the verb **receive** takes the recipient as Trajector and the thing given as primary Landmark. By convention these verbs construe the same sorts of situations in different ways, giving different degrees of prominence to the different participants. 'Give' and 'receive' are diagrammed in Figure 2, for comparison with **maka** in Figure 1.

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[3] Different factors in the objective situation will influence these construals, making one construal tend to predominate for a given situation, but they cannot absolutely determine them.

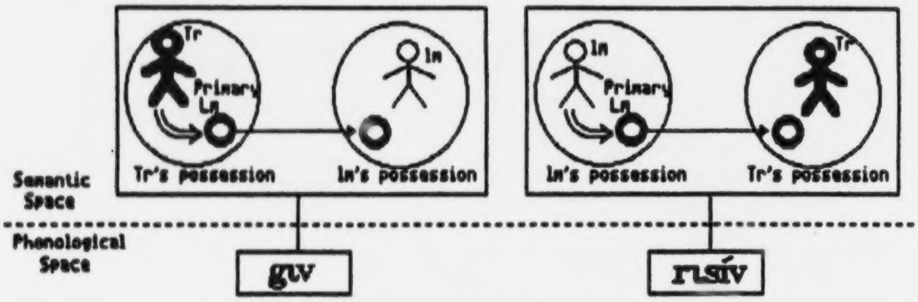
Tr
Primary Lm
Lm
Tr's possession
Lm's possession
Lm
Primary Lm
Tr
Lm's possession
Tr's possession
Semantic Space
Phonological Space
gɪv
rɪsív

Figure 2
give, receive

A verbal structure is often accompanied by nominal structures which correspond to its Trajector or landmark(s); these are its *subject* and *object(s)*. In the Nahuatl cases we will be examining these are pronominal prefixes or incorporated noun stems that attach to the verb stem, in the order subject-object(s)-verb.[4] For instance ni-mitz-maka (I-you-give) means 'I give (something/it) to you'. A diagram of this structure is given in Figure 3.

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[4] Clausal subjects and objects do occur commonly, but normally only when the prefixal object is third person, and often not even then. A Nahuatl verb with its prefixal subject and object constitutes a perfectly well-formed clause by itself.

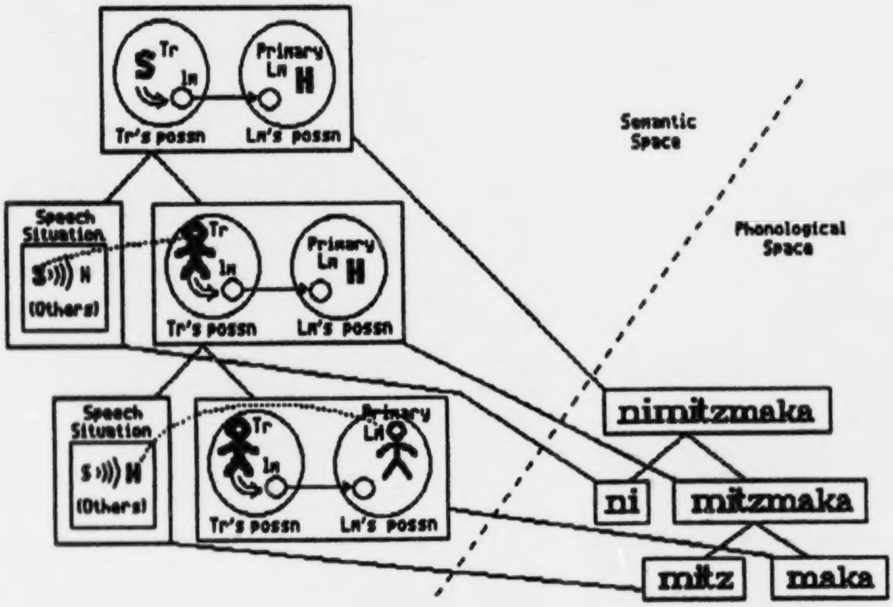
S Tr
lm
Primary
Lm H
Tr's possn
Lm's possn
Semantic Space
Phonological Space
Speech Situation
S H
(Others)
Tr
lm
Primary
Lm H
Tr's possn
Lm's possn
Speech Situation
S H
(Others)
Tr
lm
Primary
Lm
Tr's possn
Lm's possn
nimitzmaka
ni
mitzmaka
mitz
maka

Figure 3
ni-mitz-maka

2.2 Transitive and intransitive Nahuatl verb stems

All Nahuatl verb stems take a subject prefix,[5] but they are sharply divided on the question of whether or not they take an object prefix. Many verb stems virtually never do, and those that ever do virtually always do;[6] the former group are the intransitives and the latter the transitives.

It is useful to distinguish three sub-types of intransitives. (1) In some verbs there is no single salient landmark to code. E.g. in **nehnemi** 'walk' the movement of the Trajector (the animate being who walks) is certainly calculated with respect to the ground he walks over, but the ground is an extremely diffuse, non-differentiated kind of landmark, being almost coextensive with the entire background against which the action takes place. (2) In other cases there is a single salient landmark, but its nature is sufficiently indicated by the verb stem itself, so that further specification is unnecessary. E.g. the stem **tisi** 'grind corn into tortilla dough' has the corn which becomes dough as a very salient landmark, but it specifies the nature of that landmark sufficiently that the stem is intransitive. (3) Sometimes the landmark is insufficiently distinct from the trajector to merit separate specification. In **posteki** 'break', for example, the landmark with respect to which the trajector changes is itself in its canonical unbroken state. Unsurprisingly, then, this is an intransitive stem.

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[5] Some verbs (e.g. meteorological verbs) may be thought to have no subject prefix, but it is hard to prove it; the third person singular subject prefix is **Ø-** (zero), and those verbs can be analyzed as always carrying that prefix (which would be analogous to the English subject 'it' with weather verbs, e.g. 'it rained'.)

[6] There are a very few stems which can be used both transitively and intransitively; among them are **ahsi** 'reach' (**n-ahsi** 'I arrive', **ni-k-ahsi** 'I reach it'), **tōka** 'bury, plant' (**ni-tōka** 'I plant corn', **ni-k-tōka** 'I plant/bury it'), **tisi** 'grind' (**ni-tisi** 'I grind tortilla dough', **ni-k-tisi** 'I grind it'). In other dialects **tōka** and **tisi** are consistently transitive, requiring the use of **tla-** 'unspecified' object to mean 'plant corn' or 'grind tortilla dough'.

For transitive stems such as **maka**, occurrence in construction with an object is a central specification of the stem. This is natural since (1) there is a salient landmark, (2) typically distinct from the trajector, but (3) whose identity is not specified as fully as language users are likely to want.

2.3 Nahuatl object prefixes

Nahuatl has three kinds of object prefixes. The most common are a series of pronominal prefixes which we will refer to as *personal pronouns*[7], such as **nech-** 'me' and **mitz-** 'you', or **k-/ki-** 'him/her/it'. These designate either a participant in the speech process or a third person entity known to those participants, or a group including one or more participants or third persons. A second type is the reflexive **mo-**, which designates an entity characterized as identical to the trajector. This entity is related to the speech act participants only indirectly, when the trajector is so related via a subject nominal. The third kind of object prefix consists of the unspecified objects **tla-** 'unspecified thing(s)', **tē-** 'unspecified person(s)', and **ne-** 'unspecified reflexive/reciprocal'.[8] The relationship of these to the speech act participants is pointedly not specified. (**ne-** of course is a member of both the reflexive and the unspecified kinds.)

---

[7] The name must not be taken to imply that these forms invariably designate human beings; the most commonly used of them are third person pronouns, which very often designate non-human Things.

[8] The unspecified object prefixes (particularly **tla-** and **tē-**) are often used with a transitive verb stem where in English or other languages an intransitive use of a transitive stem would be expected. For instance, in the English **Did you eat yet?**, where the nature of what is eaten is not important to the speaker and hearer, **eat** is simply used without an object. In the equivalent Nahuatl **¿Kox y-o-ti-tla-kua-h?** (whether already-past-you-unspec-eat-pret) the transitive verb stem **kua** must have an object marker, but **tla-** is used, explicitly marking the fact that the speaker has chosen not to specify what was eaten.

In Figure 3 we represented **mitz-**, one of the personal pronoun objects; we represent it again in Figure 4, along with diagrams for **mo-**, **tē-** and **tla-**, representatives of the other two kinds.[9] Note in particular the presence of the Speech Situation concept in the first morpheme and its absence from the semantic structures of these last three morphemes. Also note that **tē-** is represented as simply specifying humanness, and **tla-** 'Thing-ness', of the object.

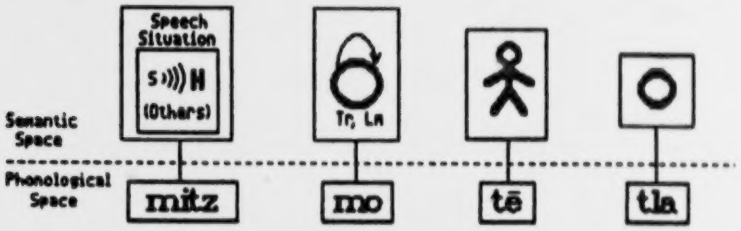

Figure 4
mitz-, **mo-**, **tē-**, **tla-**

In CG most morphemes have multiple meanings, and these object markers are no exception. In particular, the meaning of **mo-** as represented subsumes two sub-cases which will be important to us: one a true reflexive in which the trajector acts on itself, or more specifically one subpart of the trajector acts on another, and the other a reciprocal, in which different subparts of the trajector are both acting on others and being acted on by those others. These different structures are represented in Figure 5.a; all three structures are established as independent, though related, units in the grammar of Nahuatl.

---

[9] All these representations are incomplete in that they do not specifically represent the fact that these are *object* pronouns, nor that they are prefixes. These facets of their meanings are not in focus in this paper, so they are omitted to make the contrasting specifications clearer. The objecthood of the prefixes involves identification of the designated Thing with the landmark of a schematically characterized process, and prefixality the specification of a schematically characterized phonological string, symbolizing that process, which follows the particular string (**mitz**, **mo**, **tē**, etc.).

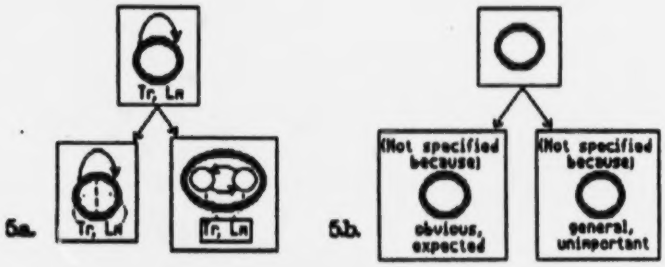

Figure 5
Three senses of mo-; three senses of tla-

The unspecified objects also have sub-meanings, which relate to why speakers would choose not to specify a landmark. Two which concern us are a general object case, in which the landmark is not specified because it is diffuse or deemed unimportant for some other reason, and a canonical object case, in which the object is not specified because it is (culturally) obvious. These will be represented in a rather ad hoc fashion as in Figure 5.b.[10]

2.4 Incorporated noun objects

Sometimes a transitive verb stem will take a non-prefixal object, a noun stem which is incorporated onto the verb stem. An example is tlāl '(arable) land',[11] in tlāl-maka 'give land to', diagrammed in Figure 6.[12]

---

[10] The arrows in Figures 5, 8, 12, and 26 represent the relationship of *schematicity*, with the schema above and its elaborations below. A schema's specifications are compatible with those of its elaborations, but it contains fewer of them; it thus gives in rough detail the picture that the elaborations give in finer detail. The schema thus represents a generalization which can be extracted from its elaborations; it also defines a class, with its elaborations as members.

[11] Nouns in Nahuatl usually carry a suffix called an *absolutive*, unless they are possessed or pluralized. The absolutive is usually -tl (after vowels), -li (after l), or -tli (after other consonants). For instance, the normal way to say 'land' is tlāl-li. However, when nouns are incorporated, just the bare stem, without the absolutive, is used.

[12] The recipient (who is the primary Landmark of tlāl-maka) is in the typical case an heir, and usually (though not invariably) the land changes hands after the death of the Trajector.

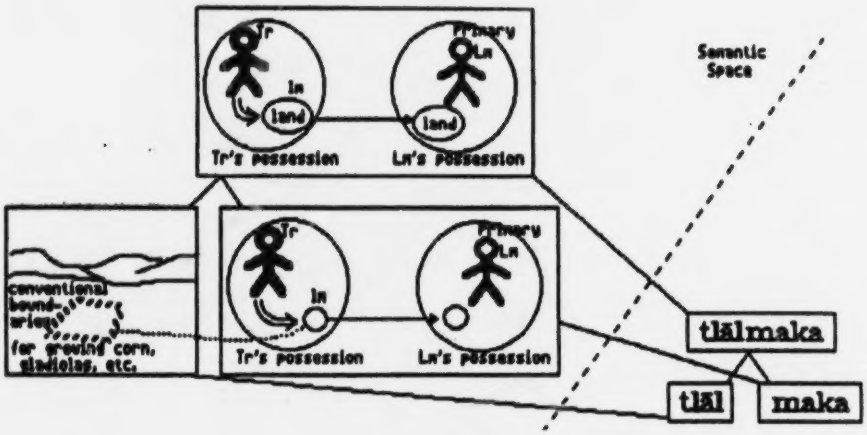
Tr
Primary
Lm
lm
land
land
Tr's possession
Lm's possession
Semantic
Space
Tr
Primary
Lm
lm
conventional
bound-
aries
for growing corn,
gladiolas, etc.
Tr's possession
Lm's possession
tlālmaka
tlāl
maka

Figure 6
tlāl-maka

Note that **tlāl** is here a secondary object; i.e. it corresponds to a secondary landmark rather than the primary one. Not surprisingly, then, the composite stem **tlāl-maka** is transitive, like **maka**, expecting to have an object corresponding to the primary Landmark, i.e. the recipient. This is illustrated by the construction **ni-mitz-tlāl-maka**, diagrammed in Figure 7.

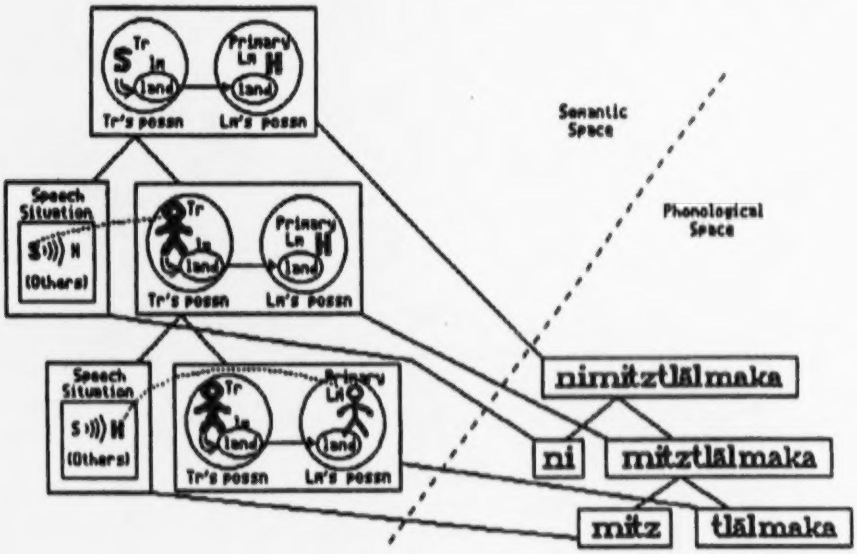
Tr
S
lm
land
Primary
Lm
H
land
Tr's possn
Lm's possn
Semantic Space
Speech Situation
S
H
(Others)
Tr
lm
land
Primary
Lm
H
land
Tr's possn
Lm's possn
Phonological Space
Speech Situation
S
H
(Others)
Tr
lm
land
Primary
Lm
land
Tr's possn
Lm's possn
nimitztlālmaka
ni
mitztlālmaka
mitz
tlālmaka

Figure 7
ni-mitz-tlāl-maka

2 DOUBLE-OBJECT CONSTRUCTIONS

Figure 7 is an example of a double-object construction; both **tlāl** and **mitz-** are objects of **maka.** This is not an uncommon phenomenon, but it is not a totally productive one either; you cannot take any transitive stem and put an extra object on it. Rather, certain stems have certain specific double-object constructions associated with them. **maka** is unusual in having so many of them; most transitive stems have fewer or none.

Several generalizations are relevant: (1) Where there are two objects, the second is an incorporated noun, an unspecified object or a reflexive, never a personal pronoun prefix. (2) One of the two objects must be the primary object of the original verb stem. The other will be a secondary object of that stem.[13] (3) The construction of the verb stem with the second object (i.e. the object that immediately precedes it) gives indications of being derivational, rather than inflectional.[14] We already noted that they are not fully productive, nor are they fully predictable in their semantic effects, and they tend to be perceived and treated as unanalyzed units rather than analyzed.

---

[13] An exception to this statement might be cases where **tla-** is used adverbially, but in those cases it isn't clear that there is a two-object construction.

[14] The derivational-inflectional distinction is a matter of degree (Tuggy 1985); what I am claiming is that the second.object-stem consructions

An important distinction in CG is made between *types* and *(grounded) instances* of types. Common nouns in English (and many other languages) generally designate *types of Things* (e.g. **mechanic**, or **airplane mechanic**). Full noun phrases (NP's), such as **the mechanic**, or **those airplane mechanics**, however, constitute grounded instances of types. *Grounding* an entity is relating it to the speech act situation: in NP's this is typically accomplished by such elements as articles and deictics. Note that personal pronouns designate not types but grounded instances of types, grounded either by identification with S or H, or by inclusion in their shared sphere of knowledge. It is for that reason that these pronouns can (and typically do) function alone as full NP's.

This distinction is important for the data we are examining. The personal pronouns, as just noted, designate grounded instances. The "unspecified object" prefixes, on the other hand, designate schematic types (**tla-** 'non-human Thing (type)', **tē-** 'human Thing (type)'), not grounded instances of those types. The reflexive **mo-** is in between; it is an instance, but it is not grounded; its relationship to the speech-act participants is not specified. Recall that in Figure 4 none of these included a relationship to the Speech Situation among their specifications. Similarly noun stems in Nahuatl designate types, not grounded instances of those types.[15] This gives us the basis we need for distinguishing between the personal pronoun objects and the other types: only they are grounded instances of the Things they designate.

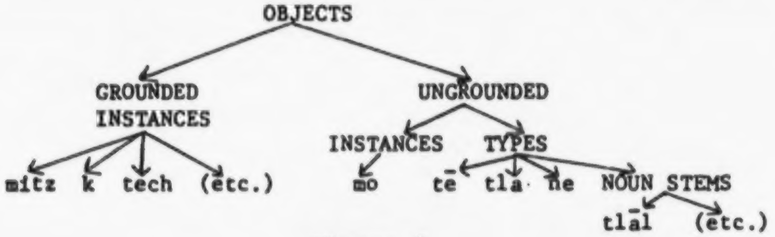

Figure 8
Kinds of objects

---

are toward the derivational end of the spectrum in contrast to (most) first object-stem constructions.

[15] I previously mentioned (footnote 11) the absolutive suffix; its meaning is very hard to pin down, but a case can be made for its having to do precisely with instantiation and grounding. A noun with its absolutive can function perfectly well as a NP, and the affixes which preclude the absolutive's use are themselves grounding or instantiating predications.

We can, then, restate our generalization (1) above to say that whenever there are two objects, the second is not a grounded instance, but rather either an ungrounded type, or an ungrounded instance.

The type-grounded instance distinction is relevant to verbal structures as well. A VP is a grounded instance of a type of process, just as an NP is a grounded instance of a type of Thing. In Nahuatl, verb words correspond in this to English VP's: they are grounded instances of types. Verb stems, like noun stems, are in themselves type specifications. Their instantiation and grounding is more complex; in particular they are grounded by relating the process itself to the speech situation (via tense and mood predications), but also via grounding their participants. It is this grounding in terms of participants that particularly interests us here.

Our observation that Nahuatl verbs are either transitive or intransitive can be restated; Nahuatl verbs expect to be grounded either through their trajector alone (intransitives), or else through both their trajector and their primary Landmark (transitives). A structure like **ni-mitz-maka** (Figure 3) is thus an example of the grounding of the stem **maka**, a transitive stem, through its trajector (ni-) and its primary Landmark (**mitz-**).

From this perspective the distinction between the personal pronominal prefixes and the other kinds of objects is very important indeed. The personal prefixes accomplish the grounding via the primary Landmark which the stem expects; all the others do not. Rather they give an ungrounded type or instance specification. An important point is that once they have done so, the verb will not be grounded via its landmark: these objects specifically avoid grounding the stem, and it will not thereafter be grounded.

What they do, in fact, is produce a new, more precise type specification. Just as the (ungrounded) modifier **airplane** in the noun compound **airplane mechanic** does not ground or instantiate the head noun type, but rather produces a new, more specific type, so the ungrounded noun **tlāl**, when joined to **maka** as object (Figure 6), does not ground that stem, but rather makes it into a more specific type. **tlāl-maka** does not designate any process of giving, but rather giving of land in particular. But giving land is a type of activity, not an instance, much less a grounded instance, of that type.

Here we see a tie-in with our generalization (3) above. If a stem is necessarily a type specification, the product of the morphological operations which ground it is not another stem, but rather a verbal (VP);[16] this is what happens when a personal pronoun prefix is put on a Nahuatl verb stem. When one of the other kinds of objects is used, however, a new stem (a new, somewhat more specific type) is produced.

---

[16] Or something intermediate, a sort of half-fledged verbal.

This, I suggest, helps explain why all the objects except personal pronouns behave like derivational affixes: they behave like them precisely because they are; they derive a new stem from the basic stem.

4 NON-PERSONAL OBJECTS PRODUCING AN INTRANSITIVE STEM

In Figure 3 we saw maka used with a personal pronoun object, and in Figure 6 with an incorporated noun object. Figures 9 and 10 represent two slightly different reflexive construals with mo- and maka, one of them a true reflexive, and the other (which requires a plural Trajector) a reciprocal.[17] ni-mo-maka means 'I give myself (something)'; se-mo-maka means 'we give each other (something)'. Figure 11 represents a usage of maka with the unspecified human object tē-; ni-tē-maka means 'I give people (things), I am generous'.

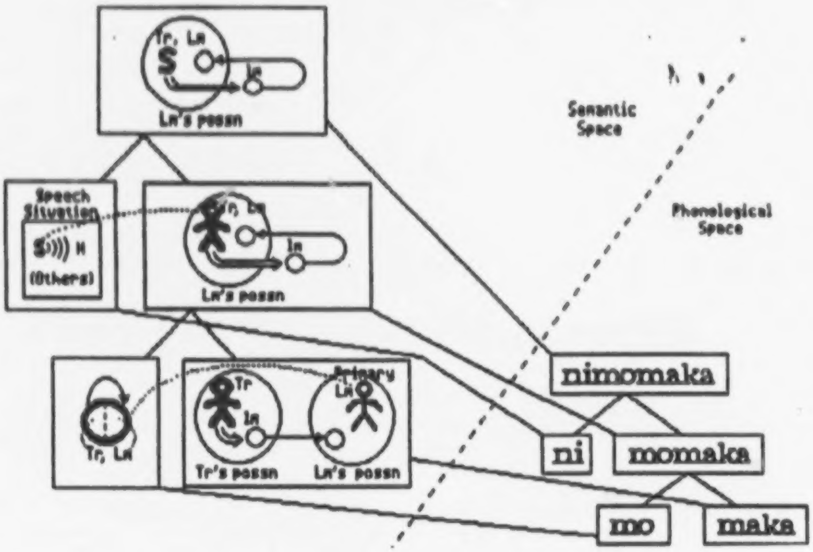
Tr, Lm
S
Im
Lm's possn
Semantic Space
Speech Situation
S)))) H
(Others)
Tr, Lm
Im
Lm's possn
Phonological Space
Tr, Lm
Tr
Im
Primary Lm
Tr's possn
Lm's possn
nimomaka
ni
momaka
mo
maka

Figure 9
ni-mo-maka (reflexive)

---

[17] The form se- 'we (subject)' is an innovation in a few towns in the Orizaba area; it derives from an impersonal subject construction using the numeral se 'one' (Burnham 1981). All other plural subject prefixes (e.g. the more usual ti- 'we') would require a suffix marking plural subject (-h for present tense). For simplicity's sake we are using the form that does not need such a suffix. Also for ease of representation we assume a version of se- with only two members of the group.

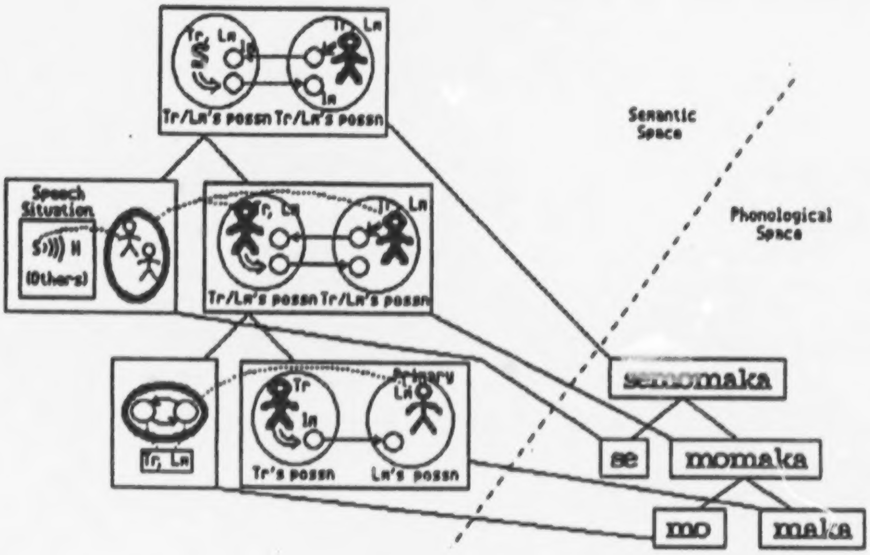
Tr, Lm
Lm
Tr, Lm
Lm
Lm
Tr/Lm's possn Tr/Lm's possn
Semantic Space
Speech Situation
S H
(Others)
Tr, Lm
Tr, Lm
Tr/Lm's possn Tr/Lm's possn
Phonological Space
Tr, Lm
Tr
Lm
Primary Lm
Tr's possn
Lm's possn
semomaka
se
momaka
mo
maka

Figure 10
se-mo-maka (reciprocal)

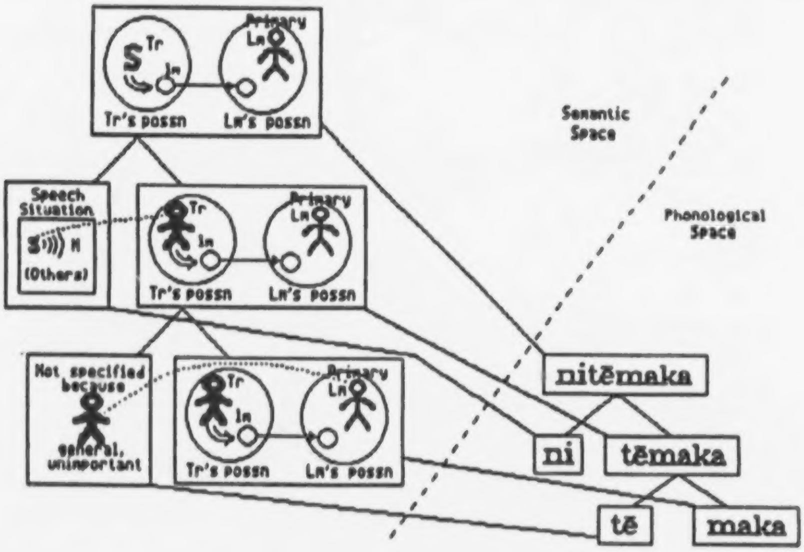
S Tr
Lm
Primary Lm
Tr's possn
Lm's possn
Semantic Space
Speech Situation
S H
(Others)
Tr
Lm
Primary Lm
Tr's possn
Lm's possn
Phonological Space
Not specified because
general, unimportant
Tr
Lm
Primary Lm
Tr's possn
Lm's possn
nitēmaka
ni
tēmaka
tē
maka

Figure 11
ni-tē-maka

In all three of these cases an intransitive verb stem is produced, as shown by the fact that the stem-cum-object combines immediately with a subject prefix (ni- or se-). The same might be said of mitz-maka in Figure 3, but if we bear in mind what was said above regarding grounding and the inflectional-derivational distinction, mitz-maka will not be seen as a new stem, but rather as a step in the normal process of grounding a stem, whereas the other constructions all form new stems. This is not to deny that the forms are all parallel, just to maintain that there is an important difference between Figure 3 and the other cases, as diagrammed in Figure 12.

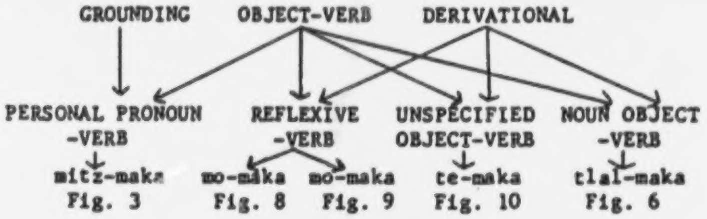

Figure 12
Kinds of object-verb constructions

The intransitive stems produced by the non-personal object constructions include two of the three kinds mentioned in Section 1.2: tē-maka is a case of a stem being intransitive because its object is general or not significant, and the two versions of mo-maka are intransitive because the primary Landmark is not separate enough from the Trajector.[18]

5 NON-PERSONAL OBJECTS PRODUCING A TRANSITIVE STEM

We now turn to cases where maka is used with a non-personal object to derive a transitive verb stem. These are the stems that give rise to the double-object constructions described in Section 2. There are two kinds of such stems: those in which the object is a secondary object, and those in which it corresponds to the primary Landmark, but a new primary Landmark is chosen for the complex stem, and it remains transitive.

5.1 Secondary objects

We have already seen one case in which a non-personal secondary object is used with maka, namely tlāl-maka in Figure 6. As Figure 7 illustrates, the complex stem continues to be transitive with respect to the recipient. There are a few other such cases with other incorporated noun objects, e.g. **teki-maka** (work-give) '(give) hassle (to)'. More interesting for us is the stem **tla-maka** 'give food to, feed' (Figure 13), with the unspecified object prefix **tla-**. This is one of the cases where an object is left unspecified because it is a canonical object, one which is obvious to members of the culture. In a construction directly parallel to Figure 7, one can say **ni-mitz-tla-maka** 'I feed you' (Figure 14); it is not possible to say ***ni-tla-maka** '*I feed'.

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[18] mitz-maka can be considered an example of the third kind, where the stem does not take an object because the object is already specified as much as the interlocutors are likely to want (cf. footnote 20).

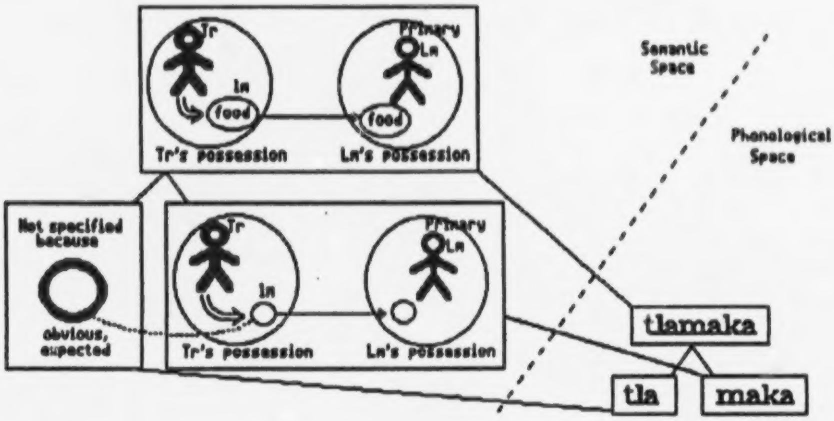
Tr
lm
food
Tr's possession
Primary
Lm
food
Lm's possession
Semantic Space
Phonological Space
Not specified because
obvious, expected
Tr
lm
Tr's possession
Primary
Lm
Lm's possession
tlamaka
tla
maka

Figure 13
tla-maka

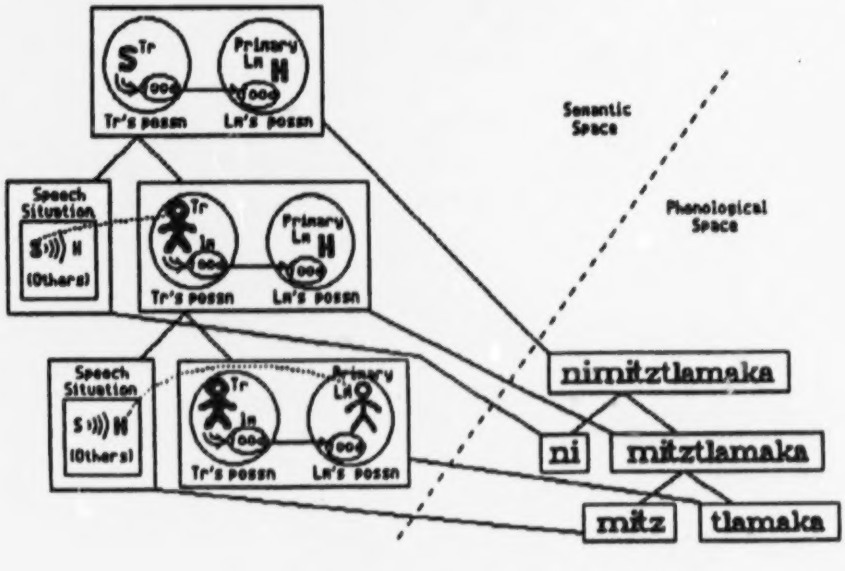
S Tr
Primary Lm H
Tr's possn
Lm's possn
Semantic Space
Phonological Space
Speech Situation
S H
(Others)
Tr
Lm
Primary Lm H
Tr's possn
Lm's possn
Speech Situation
S H
(Others)
Tr
Lm
Primary Lm
Tr's possn
Lm's possn
nimitztlamaka
ni
mitztlamaka
mitz
tlamaka

Figure 14
ni-mitz-tla-maka

5.2 Transitivity shifts

There are four cases in which a primary object, i.e. one which corresponds to the primary Landmark of **maka**, produces a stem which remains transitive, but which now expects an object corresponding to the thing given. I will assume that, although that given thing is a secondary object of **maka**, it is the primary Landmark of the composite stem.

One case is another tē-maka formation, like that of Figure 11 except that the thing given becomes the primary Landmark of the composite stem. This construction is diagrammed in Figure 15. Note that the composite structure is identical to that of the English verb 'give', diagrammed in Figure 2.

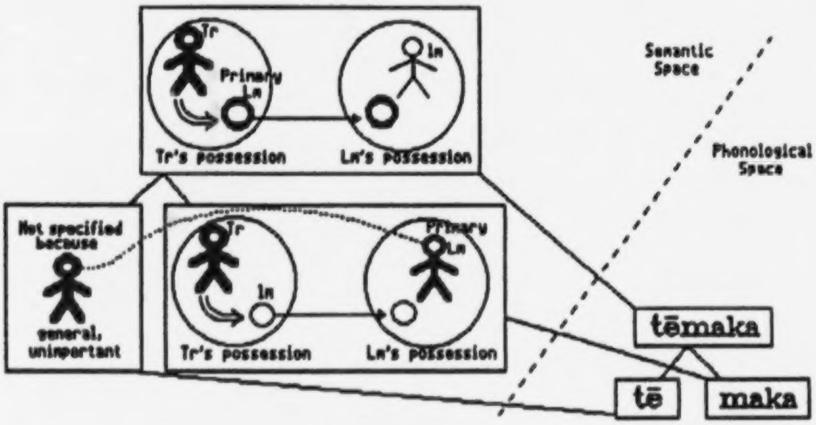
Tr
Primary Lm
lm
Tr's possession
Lm's possession
Semantic Space
Phonological Space
Not specified because
general, unimportant
Tr
lm
Primary Lm
Tr's possession
Lm's possession
tēmaka
tē
maka

Figure 15
tē-maka

Figure 16 diagrams the construction ni-mitz-tē-maka, which can be instructively compared with Figure 14; note that in ni-mitz-tla-maka the Hearer is the recipient, whereas in ni-mitz-tē-maka he is the thing given; the verb with such a human object can be translated 'betray'.

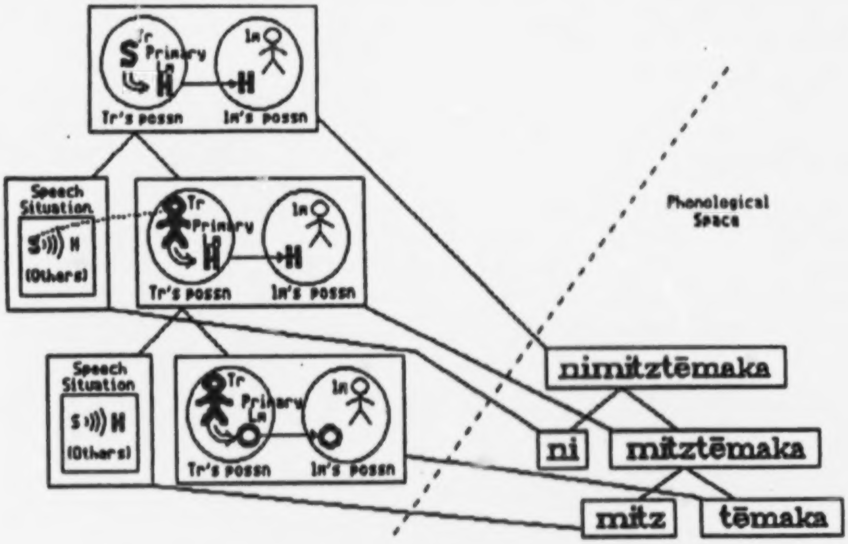
S
Tr
Primary Lm
H
lm
H
Tr's possn
lm's possn
Speech Situation
S H
(Others)
Tr
Primary Lm
H
lm
H
Tr's possn
lm's possn
Phonological Space
Speech Situation
S H
(Others)
Tr
Primary Lm
lm
Tr's possn
lm's possn
nimitztēmaka
ni
mitztēmaka
mitz
tēmaka

Figure 16
ni-mitz-tē-maka

There are two similar constructions with **mo-maka**, parallel to Figures 9 and 10, but again with the thing given taking over as primary Landmark in the composite construction. Figure 17 diagrams the construction meaning 'give oneself the Landmark', and Figure 18 the construction meaning 'give each other the Landmark'. The Landmark in Figure 18 must be a plural or a mass object, and it is usually understood that each gives this object to the other non-simultaneously. Both stems of course are used to produce grounded verbs such as **ni-k-mo-maka** (I-it-refl-give) 'I give it to myself' or **se-ki-mo-maka** (we-it-refl-give) 'we give it to each other'.

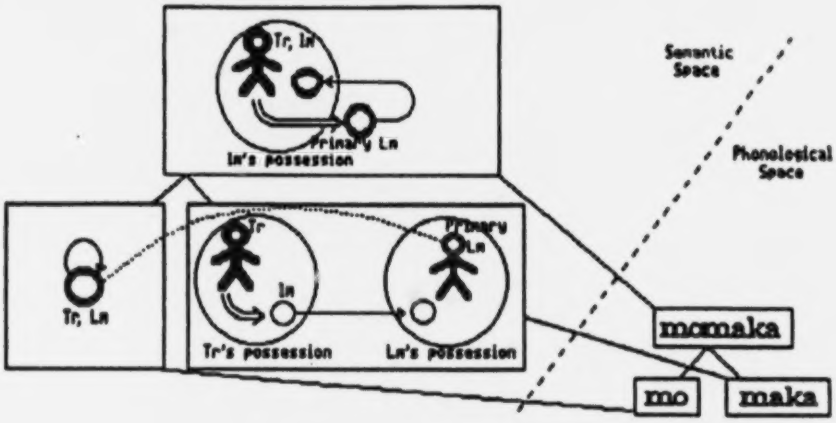
Tr, Lm
Primary Lm
Lm's possession
Semantic Space
Phonological Space
Tr, Lm
Tr
Primary Lm
Lm
Tr's possession
Lm's possession
momaka
mo
maka

Figure 17
mo-maka (give the Landmark to oneself)

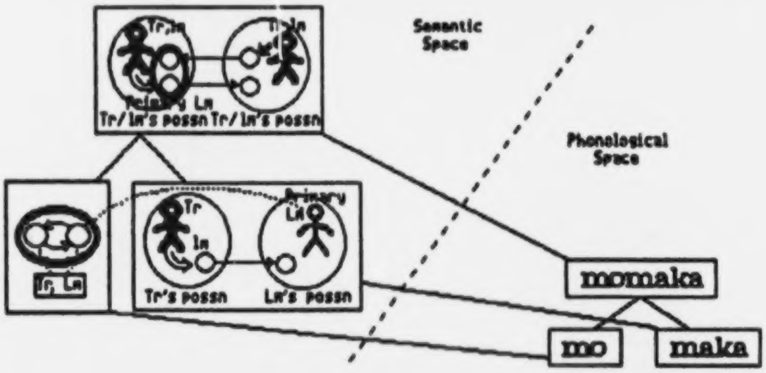
Tr, Lm
Tr, Lm
Primary Lm
Tr/Lm's possn Tr/Lm's possn
Semantic Space
Phonological Space
Tr, Lm
Tr
Primary Lm
Lm
Tr's possn
Lm's possn
momaka
mo
maka

Figure 18
mo-maka (give the Landmark to each other)

A final case involves the unspecified reflexive prefix **ne-**, in a reciprocal version.[19] The basic idea of giving thus becomes one of exchange in **ne-maka**, with the added specification that one person gives money in exchange for the other giving some item of value such as food or clothing. The person receiving the money and giving the valued item is Trajector of **ne-maka**, the valued item is the primary Landmark, and the money and the person who gives it and receives the valued item are secondary landmarks. I.e., the stem means **sell**, not **buy**; it is diagrammed in Figure 19. Once again, the construction of verbs grounded by both trajector and Landmark is expected, such as **ni-k-ne-maka** 'I sell it'; if the construction **ni-mitz-ne-maka** were constructed it would parallel Figure 16 rather than Figure 14 in that the Hearer would be the item that changes hands rather than the recipient of that item.[20]

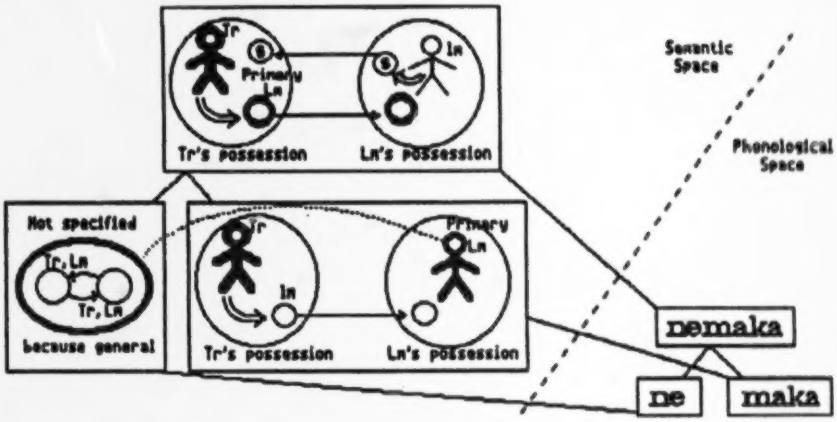
Tr
$
Primary Lm
$
Lm
Tr's possession
Lm's possession
Semantic Space
Phonological Space
Not specified
Tr, Lm
Tr, Lm
because general
Tr
Lm
Primary Lm
Tr's possession
Lm's possession
nemaka
ne
maka

Figure 19
ne-maka

6 THE MANY MEANINGS OF **mo-maa**; **kuā-maa**

In a specialized case of **maka** what is given is specifically a blow; the verb can be translated 'hit' instead of 'give'.[21] In many dialects of

---

[19] This is a very old, frozen construction, but its parts are still analyzable to some degree by native speakers.

[20] **ne-maka** seems reasonably productive with incorporated primary objects, producing intransitive stems such as **toma-nemaka** 'sell tomatoes' or **tlaol-nemaka** 'sell shelled corn'. This is a case of a stem becoming intransitive because its primary Landmark is sufficiently well specified to not need an object to further explain its nature (cf. footnote 18).

[21] The parallels with the English colloquial locution 'Give it to him' or similar Spanish expressions such as **Dale duro** (give-him. dative hard)

Nahuatl the k has softened to a g in this specific subcase, giving the form maga; in the Orizaba area it has disappeared entirely, giving maa.[22] There are a number of constructions on this stem which parallel those we have been examining, including five different construals of mo-maa (refl-hit).

maa can of course be used like a normal transitive verb, with a personal pronoun object. Thus ni-mitz-maa means 'I hit you'; it would parallel Figure 3, but with the specifications of maa imposed over those of maka in the appropriate places. Constructions with non-personal objects include tē-maa 'hit people' (parallel to Figure 11) and mo-maa 'hit oneself' (parallel to Figure 9), which we will not represent diagrammatically.[23]

The most typical construal of mo-maa, however, which we represent in Figure 20, is a reciprocal hitting parallel to the reciprocal giving of mo-maka Figure 10, and like that form requires a plural subject. Thus se-mo-maa (we-refl-hit) means 'we fight'.

'hit him hard' are not accidental, and probably are not borrowings, but natural independent developments.

[22] aa is still a bisyllabic sequence, as the (penultimate) stress indicates ([nɩmɩt^smáa] ni-mitz-maa 'I hit you'). The aa is also significantly longer than an ā, whose length is quite difficult to detect (Burnham and Tuggy 1979).

[23] There is also a stem tla-maa 'hit, be a hitter/fighter', which, like the two cases just mentioned, is intransitive. However, it is not clear that the tla- is an object; tla- has adverbial usages, among them the meaning 'customarily do' (related to the canonical object sense), and that is probably the meaning here.

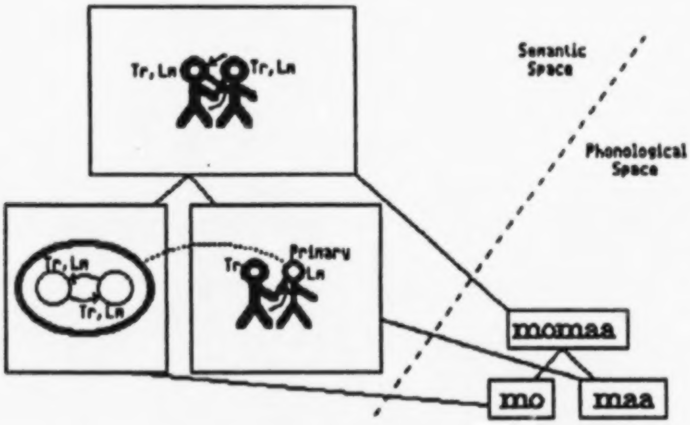
Tr, Lm
Tr, Lm
Semantic Space
Phonological Space
Tr, Lm
Tr, Lm
Tr
Primary Lm
momaa
mo
maa

Figure 20
mo-maa (fight, plural Trajector)

mo-maa, while retaining the reciprocal meaning 'fight', can also be used with a singular subject as an intransitive stem.[24] In this construction I would claim that the protagonist is both trajector (he hits) and primary Landmark (he gets hit), which makes the intransitive usage natural; his antagonist, though clearly a central part of the process, is relegated to a secondary landmark position. This structure is diagrammed in Figure 21.

---

[24] The person with whom one is fighting can be expressed in the clause as the object of the postposition -van 'with'; thus ni-mo-maa mo-van (I-refl-hit you-with) 'I fight with you'. (This is an "accompanying" 'with', not an instrumental, which would be mo-ka.)

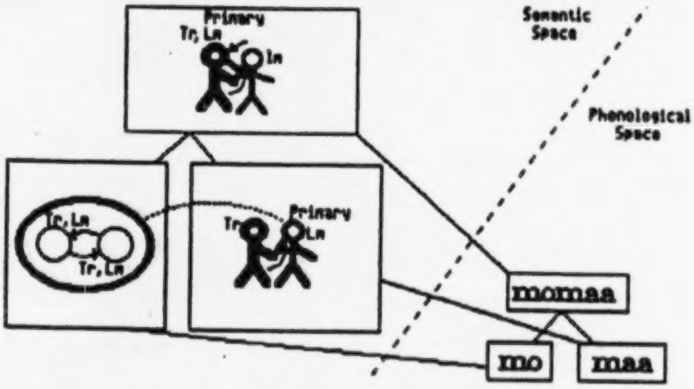
Primary
Tr, Lm
Lm
Semantic
Space
Phonological
Space
Tr, Lm
Tr, Lm
Tr
Primary
Lm
momaa
mo
maa

Figure 21
mo-maa (fight, intransitive)

In yet another construal of mo-maa the notion of fighting remains, but the protagonist and antagonist are distinguished as trajector and primary Landmark; this is a double object construction, and ni-mitz-momaa means 'I fight you'. The stem is diagrammed in Figure 22.

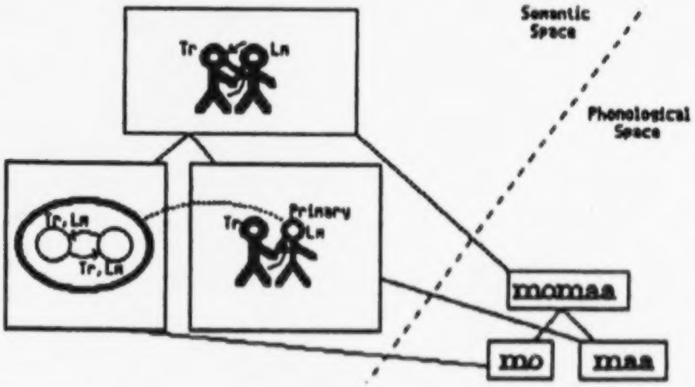
Tr
Lm
Semantic
Space
Phonological
Space
Tr, Lm
Tr, Lm
Tr
Primary
Lm
momaa
mo
maa

Figure 22
mo-maa (transitive)

In yet another construal of mo-maa, the trajector is conceived of as giving himself a blow by bumping into some object, and that object is given the primary Landmark spot. This structure is diagrammed in Figure 23.

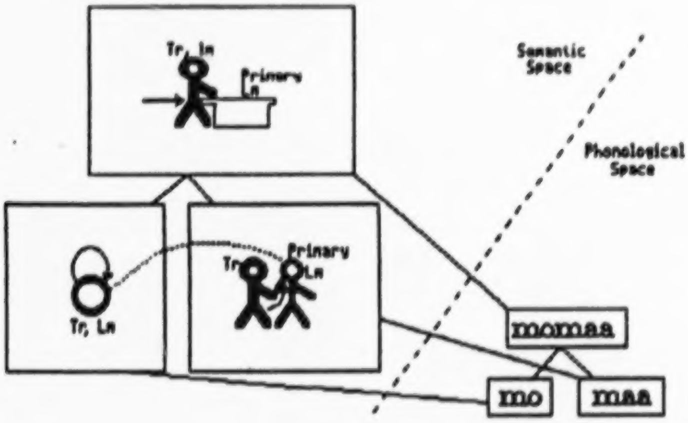
Tr, Lm
Primary Lm
Semantic Space
Phonological Space
Primary Lm
Tr
Tr, Lm
momaa
mo
maa

Figure 23
mo-maa (hit oneself against Landmark)

Finally, **maa** lends itself to a double-object construction in which a body-part noun is incorporated, which can be analyzed as either a primary or a secondary object.[25] An example (out of a number of similar cases) is **kuā-maa** 'hit the Landmark on the head'. One way to analyze this form is to view it as parallel to Figure 6, taking the head to be a a secondary landmark, a subpart of the primary Landmark of **maa** which is the person who gets hit. This analysis is reflected in the diagram in Figure 24.

---

[25] This is the most common kind of noun incorporation in Nahuatl, with Trajector's body-part or active-zone incorporations being a close second.

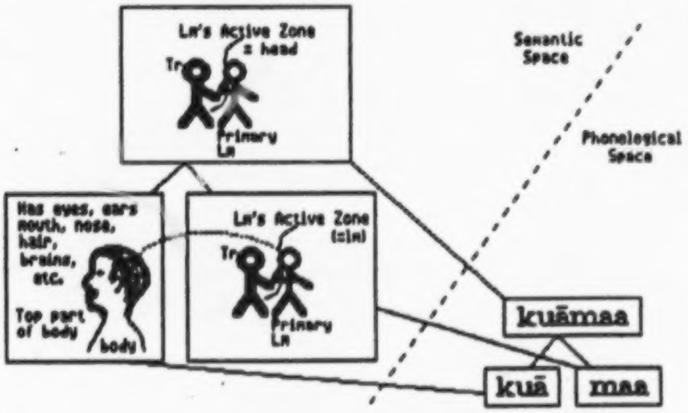
Lm's Active Zone
= head
Tr
Primary
Lm
Semantic
Space
Phonological
Space
Has eyes, ears
mouth, nose,
hair,
brains,
etc.
Top part
of body
body
Lm's Active Zone
(=lm)
Tr
Primary
Lm
kuāmaa
kuā
maa

Figure 24
kuā-maa (secondary object analysis)

Another analysis would take **kuā-** as the primary object of **maa** (after all, the head is what gets hit); with a change of transitivity between **maa** and the composite stem **kuā-maa**, in which the owner of the head takes over as primary Landmark. This analysis, which parallels that of Figures 15 and 17 (among others) is represented in Figure 25.

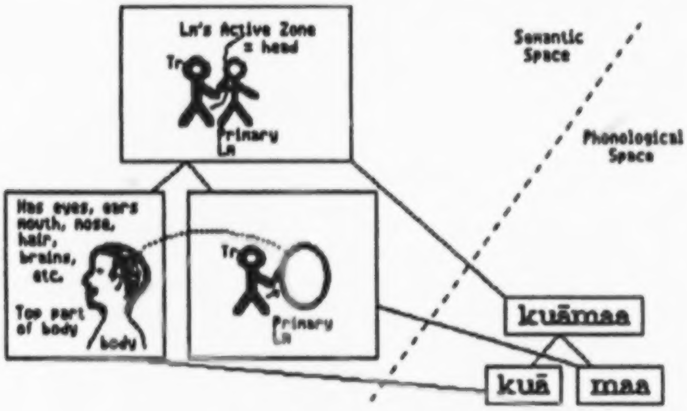
Lm's Active Zone
= head
Tr
Primary
Lm
Semantic
Space
Phonological
Space
Has eyes, ears
mouth, nose,
hair,
brains,
etc.
Top part
of body
body
Tr
Primary
Lm
kuāmaa
kuā
maa

Figure 25
kuā-maa (primary object analysis)

Under CG there is no problem with maintaining that both analyses are correct, and thus that **kuā-maa** (and the other forms of the same sort) is a kind of bridge between the two kinds of double-object constructions.[26]

7 SUMMARY AND CONCLUSION

Figure 26 presents a schematic network showing some of the classifications of the structures we have been seeing. Under CG, relations of the sort diagrammed here constitute the structural description of a form; thus, for example, the stem **kuā-maa** includes in its structural description membership in both the primary and secondary object constructions, and thus sisterhood with forms like **tlāl-maka** on the one hand and **tē-maka** on the other.

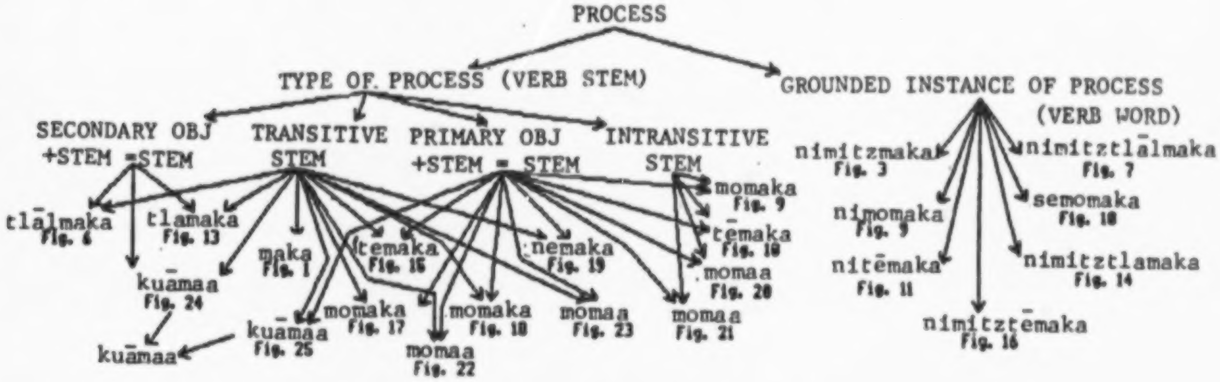
PROCESS
TYPE OF PROCESS (VERB STEM)
GROUNDED INSTANCE OF PROCESS (VERB WORD)
SECONDARY OBJ +STEM =STEM
TRANSITIVE STEM
PRIMARY OBJ +STEM = STEM
INTRANSITIVE STEM
tlālmaka Fig. 6
tlamaka Fig. 13
kuāmaa Fig. 24
kuāmaa
maka Fig. 1
temaka Fig. 15
kuāmaa Fig. 25
momaka Fig. 17
momaa Fig. 22
momaka Fig. 18
nemaka Fig. 19
momaa Fig. 23
momaa Fig. 21
momaka Fig. 9
tēmaka Fig. 10
momaa Fig. 20
nimitzmaka Fig. 3
nimomaka Fig. 9
nitēmaka Fig. 11
nimitztēmaka Fig. 16
nimitztlālmaka Fig. 7
semomaka Fig. 10
nimitztlamaka Fig. 14

Figure 26
Schematic network of constructions on maka/maa

This has been essentially a presentation of how Cognitive grammar handles a complex set of data, rather than an argument that this is necessarily a better way than what would be done under other models. It is worth noticing how many of the concepts already utilized in Cognitive grammar (e.g. the type-instantiation distinction, or schematicity) are useful in the analysis, and the fact that those concepts are independently grounded in cognition makes their contribution go beyond description to provide some degree of explanation. In many other models it would have been much harder, if it were even possible, to capture the same insights.

---

[26] For exposition of this kind of construction in the context of noun incorporations in general, see Tuggy (1981, 1986, 1987).

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TONAL INSTABILITY *

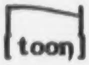
Tone as Part of the Feature Geometry

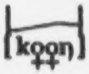
Stephen P. Walker

1 Introduction
2 Kagate
  2.1 An autosegmental analysis
    2.1.1 Introduction
    2.1.2 Tone features, tonal realization domain, and tone deletion
  2.2 Tonal instability
  2.3 Apparent tonal stability
3 Tonal instability in Zahao
4 Spreading in Nupe: Evidence that tone is a laryngeal feature
5 Summary and conclusion

1 INTRODUCTION

In this paper I present an analysis of Kagate tone,[1] within an autosegmental framework (Goldsmith 1976). The principal focus is the phenomenon of **tonal instability**, which occurs as the result of a compensatory lengthening process:

(1) /^{H}to-^{H}aŋ/ -> 
toon 'cooked.meal-also'

/^{L}kǫ̟-^{H}aŋ/ -> 
kǫ̟ǫ̟ŋ 'door-also'

In (1) the vowel of the suffix loses its melodic quality, and takes instead the melody of the previous vowel. Crucial to the topic of this paper, the tone of the suffix is simultaneously lost.

---

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[1] Kagate is a Tibeto-Burman language spoken in Nepal by approximately 1000 speakers. The speakers prefer the name Syuuba to Kagate. The dialect under consideration is spoken in the Phedi village, in the Saipu-Sabra Panchayat Ramechhap District (Höhlig and Hari 1976).

Tonal instability clearly contrasts with Goldsmith 1976, where the term "tonal stability" was coined. That analysis, in combination with work substantiating the existence of a timing tier, e.g., the CV-skeleton (Clements and Keyser 1983),[2] led to the framework where tone is directly associated to the skeleton. Thus the V-slot can delete or desyllabify, or the melodic features can delink from the skeleton, and yet the tonal information is left intact.

To account for both the tonal stability and the tonal instability facts, I propose that the location of tone within the overall geometry is subject to parametric variation. Otherwise, if tone must be directly associated to the skeleton, then we cannot elegantly account for the tonal instability facts.

Therefore I conclude that tone in Kagate is associated to the **Laryngeal node**, as part of the **Feature Geometry** (Clements 1985). This is a natural assumption to make, since Kagate is among the languages where tone register is closely related to the laryngeal feature [+Spread Glottis] (henceforth [+SG]).[3]

The organization of the paper is as follows. An autosegmental analysis of Kagate is found in §2. The preliminaries are dealt with in §2.1, and the notion of **tonal realization**, as opposed to tonal association, is introduced. The basic idea is that a tone contour may be realized over a larger domain than the one with which the underlying tone is actually associated.

Also in §2.1 is a discussion of the feature system for Kagate tone contours, as well as arguments for associating a single tone to the left edge of the realization domain. Next a tone deletion rule is proposed, to derive certain Kagate tonal patterns. Finally, I give a default rule to formally state the relationship between breathy voicing and tone.

The tonal instability facts are discussed in §2.2. Here I give a compensatory lengthening rule and a feature geometry model, to account for the instability of tone. As mentioned previously, if tone in Kagate is subordinate to the Laryngeal node, then anything affecting the Laryngeal node or Root node may also affect the tone.

---

[2] Whether the timing tier is represented as an X-skeleton, composed of mere timing units (Levin 1985), one encoding syllabicity, the CV-skeleton (Clements and Keyser 1983), or as a moraic tier (Hayes 1989) is irrelevant to the issue of instability. However, as Albert Bickford points out, the compensatory lengthening process itself substantiates the need for some tier composed of timing or weight units.

[3] Whether the feature [SG] is monovalent or bivalent is irrelevant here, but I treat it as a bivalent feature for clarity of presentation.

Kagate is not without tonal stability effects, however. These arise from a tone spreading rule, which applies before the compensatory lengthening rule (§2.3). Apparent tonal stability, therefore, can sometimes result in languages where tone is a laryngeal feature.

Zahao[4] (Osburne 1979) also has a compensatory lengthening process which results in the loss of tonal information (§3). Yip's 1980 proposal is discussed, including an explanation of why a feature geometry model succeeds where a "bottle-brush" model does not. The Zahao facts correlate closely with those of Kagate, further substantiating the instability analysis.

Finally, in §4 I discuss Nupe[5] tone spreading. The process is blocked by voiceless consonants, a possibility predicted if tone can be associated with the Laryngeal node. This, then, is further evidence that tone can, in some languages, be subordinate to the Laryngeal node.

2 KAGATE

2.1 An autosegmental analysis

2.1.1 Introduction. Before delving into the tonal instability data, and before establishing and determining the place of tone within the feature geometry, first I will present a basic description of Kagate tone, and try to determine the feature system and underlying representation necessary to account for the data.

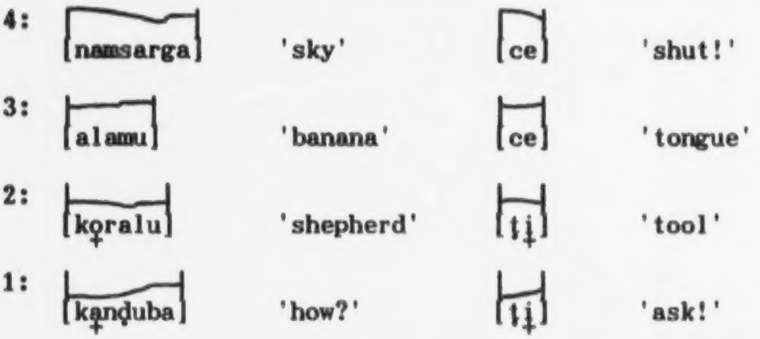
---

[4] Zahao is also in the Tibeto-Burman family, but is a Chin language spoken in north-western Burma.

[5] Nupe is a Kwa language that is spoken in Nigeria.

There are four phonetic tones, as shown in the following forms:[6]

(2)



4:	[namsarga]	'sky'	[ce]	'shut!'
3:	[alamu]	'banana'	[ce]	'tongue'
2:	[k̤oralu]	'shepherd'	[ʈi̤]	'tool'
1:	[k̤anɖuba]	'how?'	[ʈi̤]	'ask!'

As shown above, breathy voicing ([+SG]) on the initial vowel co-occurs with the lower tonal register. The register affects the pitch of the entire tonal domain (both edges of the contour), and not just the initial syllable, where the feature [+SG] is associated.

---

[6] Tone is represented graphically to the left of each form. Forms without tones are "atonal." Here I depart from Höhlig and Hari 1976 in numbering their 1, 2, 3, and 4-tones as 4, 3, 1, 2, respectively. In my system, then, the left edge of the 4-tone is the highest and that of the 1-tone is the lowest.

Vowels represented as /V̤/ are breathy voiced. Retroflex stops are /ʈ,ɖ/. I use diagonal bars, //, to enclose forms that are nearer to the underlying representations and square brackets, [], to enclose forms that are nearer to the phonetic representation.

I use the following abbreviations:

H = [+High] (tone)
L = [-High] (tone)
Lar = Laryngeal node
N = Syllable nucleus
Rt = Root node
S-Lar = Supralaryngeal node
Ton = Tonal node
[±CG] = [±Constricted Glottis]
[±H] = [±High] (tone)
[±SG] = [±Spread Glottis]
[±Up] = [±Upper] (tone register)
[±Vce] = [±Voice]

The domain for tonal realization[7] is minimally a single syllable (3), intermediately the morpheme (4), and maximally the entire word (5):[8]

(3) /^{3}syar-^{4}aŋ/ 'youngster also'

(4) /^{1}me̟me-^{4}so/ 'grandfathers'

(5) /^{4}laŋ-la/ 'to the ox'

The usual case is that the tone of the stem is realized over the entire word, including suffixes. Höhlig and Hari note (p. 46): "Most of the suffixes are atonal," as seem in (5), above. However, there are five suffixes which have underlying tone (p. 47):

(6)		
	/-^{4}so/	(honorific)
	/-^{4}kya/	(plural)
	/-^{4}kyok/	(perfect participle on verb)
	/-^{4}aŋ/	'also'
	/-^{2}ko̟y/	(2nd/3rd sing. subject; present tense)

The last suffix, /-^{2}ko̟y/, is exceptional in having a breathy-voiced vowel. The normal case is that the feature [+SG] can only be associated to a segment in the word-initial syllable. This accounts for the (otherwise) regular absence of both breathy voiced vowels and aspirated voiceless stops in non-initial syllables (see Höhlig and Hari, p. 25).[9]

---

[7] But, I argue in §2.1.2, these are not the domains for tonal association. Tone associates only with the left-edge of the domain of tonal realization.

[8] The underlying representation in (4) includes some predictable information, since either [+SG] or [±Up] is underlying. This is resolved in §2.1.2.

[9] Also, note that another subject agreement suffix is irregular. The first person singular subject suffix /-gẽ/ (pp. 17,20) has the only occurrence of a nasalized vowel in a non-initial syllable.

It would be interesting to know if these might be clitics, but there is no syntactic information and just a few sentences of text. These are not pronouns, since the word order is SOV and there are the subject pronouns /mo̟/ "she" and /kʰu̟ŋ/ "he/she."

2.1.2 Tone features, tonal realization domain, and tone deletion. The feature system that I will assume is that of Yip 1980: a feature [±Upper] to distinguish register and [±High] to distinguish height levels within the register.

Given the register and height of the left-edge of the tone contour, the rest of the contour is entirely predictable. This, combined with the (exclusive) relevance of the initial syllable to the tonal register, suggests that a single tone on the initial syllable accounts for the entire contour. Under this analysis, we have the following tones:

(7)
4-tone: [+Up], H
3-tone: [+Up], L
2-tone: [-Up], H
1-tone: [-Up], L

However, Kagate speakers might possibly distinguish between 2 and 1-tones by the relative height of the highest point in the contour.[10] If this is the case, then we should reverse the values for [H/L] for these tones, since the 1-tone actually rises higher than the 2-tone.

In support of my analysis, however, are the suffixes in (6). Four of the five suffixes have 4-tones: [+Up], H. This suggests that this is the default tone (the completely unspecified tone). Note also that the fifth suffix has a 2-tone: [-Up], H. If [Up], the tone register feature, is underlyingly unspecified, but arises through default rule (8b), then the tone for all five of the suffixes is the default tone: H.

This analysis requires the following default rules, the second of which formalizes the relationship between breathy voicing and tonal register:

(8) **Default Rules:**

a. [ ] -> [+H]
b. [+SG] -> [-Up]
c. [ ] -> [+Up]

All vowels are, then, unspecified for [±Up] in underlying representations. It would have been possible, of course, to state the reverse of the first default rule ([-Up] -> [+SG]). This is undesirable, however, because of the suffixes mentioned above, and because if the feature [SG] is underlying it allows us to unify the constraints on this feature.[11] This analysis also falls in line with the generalization that consonants types (i.e., their laryngeal features) affect tone, but not the reverse.

---

[10] Juliette Levin pointed out this possibility.

To indicate the move toward a radically unspecified representation (Archangeli 1988), henceforth the material in angled brackets will not contain a number for tone. Instead of numbers there will be H or L. The tone contour is then derivable from whether the initial vowel is clear or breathy-voiced. The four tones are, then:

(9) 4-tone: H, V
3-tone: L, V
2-tone: H, V̟
1-tone: L, V̟

Although H-tones are underspecified underlyingly, I will continue to mark them, so as to distinguish between tonal and atonal morphemes.

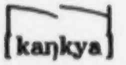
A consequence of radically underspecifying the underlying tone, as in (7), is that complex contour tones must accounted for with a single tone (or no tone at all). The phonetic interpretation rules bear the burden, then, of determining the actual tone contour over the time continuum (Yip 1987).[12] These rules will take a single tone as their input, and produce level and contour tones over a string of syllables, until the next tonal syllable or the end of the word is encountered.

In other words, if there are tonal suffixes, then they will each have a single tone, and it will mark the left edge of its own tonal realization domain as well as the right edge of the previous domain. So, although tone is realized over a certain domain, tone is associated only with the beginning of that domain. As we will see, this greatly simplifies the tone spread processes in this language, since it only involves the spread or loss of a single tone.[13]

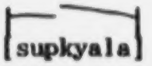
---

[11] For example, [+SG] can only be associated to segments in the word-initial syllable. Also, if the initial vowel is clear-voiced ([-SG]), then the voicing of obstruents in that syllable is (predictably) [-Vce]: /^{H}ke/ 'bear!' vs. ^{L}[ke̟] 'break!' and ^{L}[gu̟] 'corner.' This curious fact suggests that [±SG] is an underlying feature of vowels, not [±Up], since [SG] is more closely related to [Vce] than is [Up].

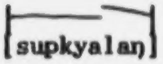
[12] Yip cites Pierrehumbert, J. and M. Beckman 1986 (Japanese Tone Structure. Unpublished ms., AT&T Bell Labs and Ohio State University), which I have not seen.

(10) a. /^{H}kaŋ-^{H}kya/ ->


'nipples of udder'

b. /^{L}sup-^{H}kya-la/ ->


'in the holes'

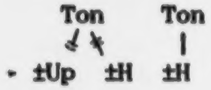
c. /^{L}sup-^{H}kya-la-^{H}aŋ/ ->


'in the holes also'

In (10c) the tone of /-^{H}kya/ disappears. Assume, for the moment, that the rule (or constraint) that deletes this tone can also apply to contour tones on bi- or trisyllabic morphemes. If we represent such contour tones as sequences of level tones, associated to the left and right edges (Yip 1987), then clearly whatever accounts for the loss of the tonal contour would have to delete both tones (HL or LH). This is an unnecessary complication if we assume that contour tones are the result of a single underlying tone.

For example, for (10c) we can specify this rule in a relatively uncomplicated format (were it to involve the deletion of two tones, then it would have been hopelessly complicated):[14]

(11) **Central-Tone Deletion (CTD):**



This rule states that if there are two adjacent Tonal nodes, the first of which is unspecified for [±Up], then delink the first tone from its Tonal node (only H-tones will occur in this environment). The rule in (11) might be motivated by the fact that we don't find sequences of three tones in the language.[15] It relies on the underspecification of [±Up] for all vowels except the initial vowel, as well as that the initial vowel is specified for [±Up] before Central-Tone Deletion can apply. Therefore the default rule (8b) must apply before CTD, so that the initial tone is not deleted; and the default rule (8c) must not apply to non-initial syllables before CTD applies, so that the relevant tones are deleted. Default rule (8a), like (8b), must apply before CTD applies.[16]

---

[13] The second example (10b) is not actually given in Höhlig and Hari, but is based on their description: "(Atonal suffixes) have no pitch of their own. The realization of their pitch is dictated by the contour of the stem morphemes" and "A tonal suffix has a distinctive pitch of its own -- the realization of its pitch does not fall under the contour of the stem" (p. 46).

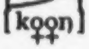
[14] This rule cannot be formulated in terms of the Tonal node delinking from the Laryngeal node. Such a rule would be blocked by intervening consonants, since the Laryngeal nodes would not be adjacent.

[15] Juliette Levin pointed out this possibility.

2.2 Tonal instability

The delinking and compensatory lengthening process previously mentioned are shown in (12):

(12) a. /^{H}to-^{H}aŋ/ -> [tooŋ] 'cooked.meal-also'

b. /^{L}ko̟-^{H}aŋ/ ->  [ko̟o̟ŋ] 'door-also'

The segmental melody of the suffixal vowel does not surface. The tone of the suffix, an upper register falling tone, does not surface either. But, crucially, the timing slot remains, and the melody of the previous vowel spreads. If this were not the case, then we would analyze this as a case of deletion of the melody, the timing slot and also the tone. However, since the skeletal slot remains, this shows that delinking, and not deletion, is taking place.

Under the traditional autosegmental representations of tone, where tone associates to the skeleton directly, we can formulate the compensatory lengthening and tone loss rule as in (13):

(13) **V-Cluster Simplification:** (preliminary version)[17]

```
T1  T2     (Tonal tier)
|   ‡
V   V      (Skeleton)
| ,-'‡
Rt  Rt     (Root node)
```

However, the multiple cases of delinking give us ample reason to wonder if this is the correct rule. That is, unless there is independent evidence of tonal delinking in this environment, then we prefer to view the disappearance of the vowel melody and the tone as a single process.

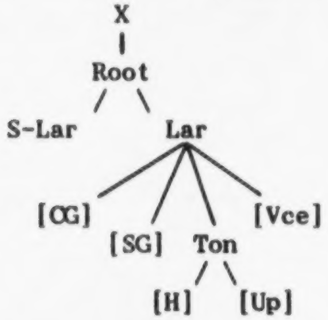
---

[16] It is interesting that CTD cannot be formulated in a framework where the Tonal node is directly associated to the skeleton, since the V-slots would not be adjacent. This might tempt one to invoke the OCP (Yip 1988), which, I plan to argue in a future version of this paper, will lead to incorrect results.

[17] Rather than delinking or spreading the highest possible node, the root node, the vowel assimilation process could be seen as delinking or spreading just the Place or Dorsal node.

The proper representation for V-Cluster Simplification must include tone as part of the segmental melody. Otherwise we have to delete the tone and the melody independently but simultaneously, which is a problem. This new representation is where breathy voicing comes into play. If both tone and [+SG] are daughters of the Laryngeal node, then perhaps that will help explain why breathy voicing co-occurs with the lower tonal register. It will also explain tonal instability, since delinking of any of the association lines connecting it to the skeleton will result in tone loss.

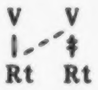
(14) **Tone as a Laryngeal Feature:**



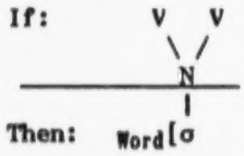
My proposal is that at least some languages represent the Tonal node as subordinate to the Laryngeal node, as opposed to its being directly associated to the skeleton. For such languages **tonal instability** is a possibility.

Within the understanding that (14) brings, we can revise the V-Cluster Simplification rule as follows:

(15) **V-Cluster Simplification (VS):** (final version)



V-Cluster Simplification applies lexically, only in derived environments (obeying the Strict Cycle Condition), and is structure preserving. For example, it cannot create long vowels in non-initial syllables, due to the following well-formedness condition.[18]

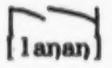
(16)


This well-formedness condition states that if there is a branching syllable nucleus, then that syllable must be word-initial.

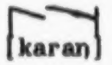
2.3 Apparent tonal stability

There are cases of apparent tonal stability in Kagate, which would seem to invalidate the proposal that tone is a laryngeal feature. This, I argue, is due to a tone spreading process.

The tonal instability occurs only when the suffix is vowel-initial (/-^{H}aŋ/) and the stem is both vowel-final and monosyllabic. If the stem ends in a consonant or is not monosyllabic, then the tone of the suffix remains, as in (17):

(17) a. /^{H}laŋ-^{H}aŋ/ ->


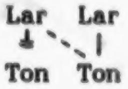
'ox also'

b. /^{H}kara-^{H}aŋ/ ->


'shawl also'

The consonant-final stem, (17a), presents no problem, since V-Cluster Simplification does not take place. The disyllabic stem (17b), however, seems to exhibit tonal stability. I analyze this as an environment where tone spreading occurs:

(18) **Tone Spread (TS):** (preliminary version)



The tone spreads leftward to a vowel unspecified for tone. Because TS is a lexical rule, Structure Preservation (Kiparsky 1982) ensures that tone cannot spread to consonants.

---

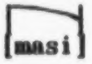
[18] Here I follow the format of Itô 1986. Incidentally, the V-Cluster Simplification rule in (15) may not need to be stipulated as such, but may well be the result of syllabification parameters and well-formedness conditions. What is important is that the process involves delinking the root node from the second vowel slot, whatever the cause.

To account for the above data, Tone Spread (TS) and V-Cluster Simplification (VS) must be ordered as follows:

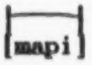
(19) <TS,VS> (counterbleeding with respect to (17b))

The result is in (17b) that the tone from /-^{H}aŋ/ spreads to the previous vowel, which (crucially) is not specified for tone. Simplification applies, deleting the suffixal vowel /a/. The tone remains behind, but not because of normal tonal stability, but because of the previous rule of tone spread.

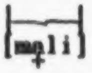
Tone Spread is independently required in the grammar, given the existence of the following forms (p. 46):[19]

(20) /ma-^{H}si/ -> 

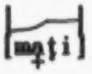
'did not die'

/ma-^{L}pi/ -> 

'did not take off'

/ma-^{H}li̟/ -> 

'did not remain'

/ma-^{L}ti̟/ -> 

'did not ask'

The tone is underlyingly associated, I propose, to the initial vowel of the stem. The feature [+SG] must shift leftward (perhaps it is assigned under stress, which is initial) to meet a well-formedness condition. After that occurs, the default rule (8b) specifies the initial syllable as [-Up], if applicable.

The above data do seem to present a problem for Tone Spread, however. Since /ma-/ can (presumably) prefix to any verb, then a stem-initial obstruent that is specified for [±Vce] ought to block the application of Tone Spread. Höhlig and Hari mention no such possibility.

---

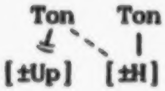
[19] Other than /ma-/, there are no prefixes in the language.

Note that V-Cluster Simplification (15) would be expected to apply if /ma-/ attached to a vowel-initial verb stem. The description does not mention that this occurs. There are only a handful of vowel-initial verbs, and the only case of a medial onsetless syllable is [ka̟en] "cucumber," which fluctuates with [ka̟yen]. So the onset is obligatory, and perhaps the few exceptions meet this well-formedness condition by having an underlying empty C-slot as onset. The other alternative is to reformulate (15).

Aspiration is completely unpredictable in all stem-initial stops (whether or not the following vowel is breathy-voiced is irrelevant). Therefore they should block the application of TS, as written.[20]

The solution is to rewrite the rule as applying to adjacent Tonal nodes. Thus TS will not be blocked by intervening consonants, since they have no such node. But if the rule spreads [+H] tones to the left-adjacent Tonal node, then the rule must be prevented from spreading tones onto initial syllables. This can be achieved by ensuring that the left Tonal node is unspecified for [±Up].

(21) **Tone Spread (TS):** (final version)



This rule says that if there are two adjacent Tonal nodes, the left one unspecified for [±Up], then spread the value for [±H] (i.e., [+H]) of the right Tonal node leftward. This solves the problem of intervening consonants not blocking blocking TS, since they have no Tonal nodes.

Notice the similarity of this rule to Central Tone Deletion (11). The similarity goes beyond mere appearances, since TS, like CTD, requires that default rules (8a) and (8b) apply before it (so that the rule can apply and so that the initial tone is not spread to, respectively); and that default rule (8b) must not apply to non-initial syllables before TS applies (so that the relevant Tonal nodes are spread to). In other words, TS and CTD have the same crucial orderings with the default rules (8a,b).

It is now possible to eliminate CTD, in favor of TS. If TS applies to a Tonal node that is already specified for [±H], then the spreading of the new value results in automatic delinking of the old. If, on the other hand, TS applies to a Tonal node that is unspecified for [±H], then the left Tonal node marks the beginning of a tonal realization domain. The reason for the deletion of the central tone is now explained, given the existence of Tone Spread.

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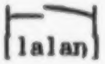
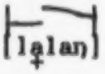
[20] The most transparent way out of this problem is to appeal to Left-to-Right Association Conventions and Lexical Phonology to try to account for the supposed tone spreading. However, as Steve Marlett has helped me to see, that would require the Association Conventions to apply at the end of the stratum (i.e., after affixation). This would require a modification of Pulleyblank 1986, which asserts that the Conventions apply wherever they may.

Furthermore, there are certain data that I plan to prove (in a future version of this work) cannot be accounted for unless tone is underlying associated (i.e., pre-associated).

With that apparatus in place, we will now go through some novel tone patterns, to see if it indeed predicts the correct pattern. One pattern not yet discussed occurs if a tonal suffix follows an atonal one (p. 48):

(22) /^{L}la-la-^{H}aŋ/ ->


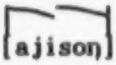
'soul-in-also'

/^{H}la̟-la-^{H}aŋ/ ->


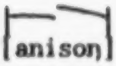
'height-on-also'

Rather than receiving its tone from the preceding morpheme, the atonal suffix /-la/ receives its tone from the following suffix, /-^{H}aŋ/. This result is predicted by TS, since it ought to apply here.

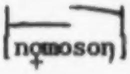
The following forms have bisyllabic stems, with two tonal suffixes (p. 49):

(23) a. /^{H}aji-^{H}so-^{H}aŋ/ ->


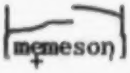
'elder.sister-honorific-also'

b. /^{L}ani-^{H}so-^{H}aŋ/ ->


'aunt-honorific-also'

c. /^{H}no̟mo-^{H}so-^{H}aŋ/ ->


'younger.sister-honorific-also'

d. /^{L}me̟me-^{H}so-^{H}aŋ/ ->


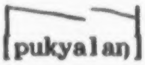
'grandfather-honorific-also'

In each example in (23a-d) there is a toneless vowel, the second vowel of the stem. Tone Spread appears like it should have applied here, but it did not. However, if /-^{H}so/ is a Level I affix, and if TS applies on the second stratum, then this is no problem.

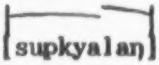
In (23a), for example, the result of Level I morphology is [[^{H}aji]^{H}so]. At some point the default rules apply, supplying the initial syllable's vowel with the feature [+H, +Up] (Structure Preservation prevents the other vowels from being specified [+Up] at Level I) and non-initial vowels with [+H]. V-Cluster Simplification cannot apply, since its environment is not met. So the form is unchanged after Level I phonology, with the exception of the feature filling default rules, syllabification, etc.

The result of Level II morphology is [[^{H}aji^{H}so]^{H}aŋ]. Default rule (8a) supplies the feature [+H] for the vowel of the suffix. Structure Preservation prevents this vowel from being specified for [±Up], since only the initial vowel can take this feature. Tone Spread applies, spreading [+H] from /-^{H}aŋ/ to the Tonal node of /-^{H}so/. This results in the original [+H] on /-^{H}so/ being automatically delinked (since a single Tonal node cannot bear two specifications of [±H]). Now V-Cluster Simplification applies, spreading the Root node of /o/ to /a/. This also results in automatic delinking, of the Root node of /a/. The end of the cycle syllabification attempts to syllabify the entire word, but the well-formedness condition in (16) prevents the second V-slot from being syllabified, and it is Stray Erased (Itô 1986). And so the apparently problematic example is correctly predicted.

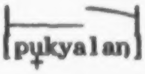
Now I will repeat the problematic data in (10c), along with similar examples (p. 49):

(24) /^{H}pu-^{H}kya-la-^{H}aŋ/ ->


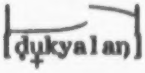
'feather-pl.-in-also'

/^{L}sup-^{H}kya-la-^{H}aŋ/ ->


'hole-pl.-in-also'

/^{H}pu̟-^{H}kya-la-^{H}aŋ/ ->


'son-pl.-to-also'

/^{L}ɖu̟-^{H}kya-la-^{H}aŋ/ ->


'grain-pl.-in-also'

This data is still problematic, given CTD and TS as a single rule. Even if the combined TS rule applied iteratively, it would still not work for the above forms. The tone on /-^{H}aŋ/ would spread to /-la/, and then (incorrectly) spread to /-^{H}kya/. Also, iterative application of TS would derive the wrong results for the forms in (23a-d). Cyclic application would not help either, since the environment for TS is not met until /-^{H}aŋ/ is affixed.

Despite the explanatory force of a simple Tone Spread rule, it appears that two separate rules may be necessary.[21] In such a model, we need to specify that CTD applies before VS, or VS might bleed CTD:

(25) <CTD,VS> (counterbleeding with respect to (24))

On the other hand, CTD and TS are unordered. Say, then, that CTD applies first. The two non-initial Tonal nodes result in the application of Central-Tone Deletion. Now /-kya/ has no tone. Next, Tone Spread applies, moving the H-tone of /-^{H}aŋ/ to the atonal /-la/. Then V-Cluster Simplification applies, delinking the vowel melody of /-^{H}aŋ/. The result is that the stem tone stays put, unchanged, and the H-tone of /-^{H}aŋ/ spreads to the suffix /-la/, the correct result.

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[21] An alternative would be to posit an additional rule to handle just this case.

3 TONAL INSTABILITY IN ZAHAO

The tonal instability facts are similar in Zahao (Osburne 1979, Yip 1980 and 1982). In the following forms (26) the melody of the stem vowel spreads to the following V-slot, resulting in the automatic delinking of the suffixal vowel melody (or delinking and compensatory spreading). Here, as in Kagate, the tone of the suffix deletes with its vowel melody:[22]

```
(26)      H ? L H        H          H           *  HL H
          |  \|/   ->  / \   ->   / \              ||/
         na   in      na in      na an       (not naan)         'but'

          L  L    H ? L H       L  L   H        *  L  L   HL H
          |  |    |  \|/  ->   |  |   |\          |  |   ||/
         zanrangte    in     zamrangteen    (not zamrangteen)  'quickly'
```

This data was cited in Yip 1980 and 1982, where she says:

> Firstly, what is actually deleted is the tone and the glottal stop, not the vowel. Both these are laryngeal phenomena, and as such this may in fact be an argument in FAVOR of an independent laryngeal tier on which both tone and glottalization are represented... The deletion is then of the information on this laryngeal tier, while the segmental tier remains untouched. Subsequently the two adjacent vowels assimilate.
>
> Secondly, it is not clear from Osburne's article how general a phenomenon this elision is, but in her thesis... she states specifically that this adverbial particle is the ONLY morpheme that elides in normal speech. It is therefore a morphological rather than a phonological rule, and as such would not necessarily be expected to obey the predictions of the stability hypothesis [emphasis hers].

I'd like to comment on these two points. With regard to the first, my conclusions match Yip's: the interaction between tone and laryngeal features argues for the possibility of an "independent laryngeal tier."[23] Within feature geometry, however, tone would be subordinate to the Laryngeal node, which would be part of the entire melody, as in (14).

---

[22] The Osburne 1979 article makes no mention of the status of /ʔ/, the glottal stop. Yip 1982 analyzes this process to include elision of /ʔ/, but I suspect that is a vowel feature ([+CG]) that sometimes surfaces as an onset.

[23] Yip 1987 mentions (in passing) "the issue of whether the Laryngeal node, some sub-node we might call Tonal are (where tone is associated)." It appears, then, that I am certainly not the first to propose a Tonal node daughter to the Laryngeal node.

Yip claims, however, that the deletion of the laryngeal information and the vowel assimilation are distinct processes. This claim is a necessary consequence of an autosegmental model where the laryngeal tier and the vowel place features tier are distinctly associated to the skeleton, as in the "bottle-brush" model. Such a model has the same problem with tonal instability as the standard "feature geometry" model. In either case, tone and place features are independently associated to the skeleton, and so the tonal instability facts require two separate processes.

Such an analysis seems suspect, however, since in Kagate there is the identical clustering of properties: vowel assimilation, loss of tonal information, and some involvement of laryngeal features. As shown in §2.2 for Kagate, this clustering of properties is no accident with the representation in (14), where tone is subordinate to the Laryngeal node, and the single rule in (15), spreading the root node from one vowel to the next V-slot.

Turning to Yip's morphological analysis, note that /-^{H}aŋ/ is the only suffix in Kagate that loses its tone. This suffix, however, happens to be the only vowel-initial suffix in Kagate. This is why the tonal instability effects only occur with /-^{H}aŋ/, because the language does not allow true vowel clusters. A morphological analysis is unwarranted, then, to explain the tonal instability.[24]

4 TONE SPREADING IN NUPE: EVIDENCE THAT TONE IS A LARYNGEAL FEATURE

Now we turn to Nupe. Hyman 1975 refers to the following Nupe data (27) as showing how "different consonant types frequently interact with natural tonal assimilations." (p. 228).[25]

(27)	/pá/	'peel'	[èpá]	'is peeling'
	/bá/	'be sour'	[èbǎ]	'is sour'
	/wá/	'want'	[èwǎ]	'is wanting'

(28)	/gbìgbì tí/	'an owl hooted'
	/gbìgbì ètí/	'an owl is hooting'

Here the low tone of the progressive tense marker /è-/ is spreading to the stem, to form a rising tone, but only if the intervening consonant is voiced. Thus [-Vce], a laryngeal feature, blocks the spreading of tone.

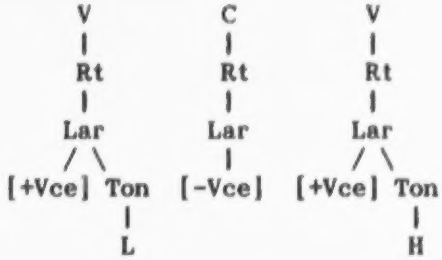
---

[24] There is not enough data in the Osburne 1979 article to determine if there is a similar explanation for the exceptionality of the /-ʔin/ suffix in Zahao.

[25] The data in (28) is from Kenstowicz & Kisseberth (1979, p. 268), who cite George 1970.

First let's look at a representation where the Tonal node is a daughter of the Laryngeal node, along with voicing, etc. Here, in (29), we see that the [-Vce] feature does not prevent adjacency of the two Tonal nodes, and thus will not necessarily block tone spreading. The intervening consonant does not have a Tonal node, and so the Tonal nodes of the vowels are adjacent:

(29)



Perhaps, then, the rule specifies spreading of the Laryngeal node. One way to ensure this would be if languages without a register distinction, such as Nupe, do not have Tonal nodes. If that is true, then the Nupe tone spreading rule would involve two (necessarily adjacent) Laryngeal nodes. The [-Vce] consonant, with its own Laryngeal node, would block the adjacency of the two Laryngeal nodes, and thus block the application of tone spreading. Voiced consonants, on the other hand, would have to be unspecified for laryngeal features, or perhaps share a Laryngeal node with a neighboring vowel.[26]

The main point is that to adequately account for the Nupe facts, tone must be subordinate to the Laryngeal node, and not directly associated to the timing tier.[27]

---

[26] Another possibility, pointed out by Juliette Levin, is that voiceless consonants are specified for tone (perhaps by regressive spreading from the following vowel). The specification of tone on the consonant might prevent the forward tone spreading, if the rule specifies spread to vowels alone. However, this analysis seems to me an ad-hoc method for blocking tone spread. Is there any other evidence that in Nupe voiceless consonants can and should be specified for tone?

Another alternative is that tone in Nupe is subordinate to the [±Vce] feature. In this case, a [-Vce] consonant will prevent the two [+Vce] features of the vowels from being adjacent. Again, we must state that [+Vce] consonants are unspecified for that feature (at this point in the derivation), or that they share the [+Vce] feature with a vowel. The problem with this analysis is that vowels need not be specified for [±Vce] underlyingly. In any event, I hope to have shown that tone is subordinate to the Laryngeal node in Nupe.

[27] Schuh 1978 also mentions Bade, Bolanci, Zulu, and Ngizim as languages in which laryngeal features block tone spreading.

5 SUMMARY AND CONCLUSION

The question of where tone associates (or is underlyingly associated) is subject to parametric variation. In some languages, tone is associated with the skeleton. There is no possibility of tonal instability effects, although stability effects may well occur.

In other languages, however, tone is associated to the Laryngeal node, whether underlyingly or by convention. The strongest claim is that in all "laryngeal tone" languages the specified tones are underlyingly associated, rather than by convention. This may often or always arise through tonogenesis (Matisoff 1973). Some tone bearing units may be unassociated with any tone. Intervening consonants may block the spreading of tone. In such languages, there may be cases of tonal instability, and sometimes apparent stability.

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A MORPHOLOGICAL PARSER FOR LINGUISTIC EXPLORATION

David Weber

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1 INTRODUCTION

This paper describes AMPLE, a morphological parser (i.e., a program that parses words into morphemes). AMPLE grew out of work in computer assisted dialect adaptation, as described in section 1. It contains no language-specific code, being controlled entirely through external, user-written files, the notations of which were designed for linguists. AMPLE's constructs are linguistic: "allomorph", "morpheme", "conditioning environment", "co-occurrence constraint", etc.

AMPLE's fundamental algorithm is (i) to discover all possible decompositions of a word into allomorphs, and (ii) to eliminate those which fail any conditions, constraints or tests imposed by the user.

This match-and-filter algorithm allows a highly modular approach to morphological parsing. Strong rejection of incorrect analyses is achieved by the combined effect of diverse filters, each expressed simply in a notation appropriate to the phenomena.

AMPLE is a good tool for exploring morphology because of the flexibility resulting from this modularity. And it is usable by computationally naive linguists because its notations are linguistic rather than computational.

2 COMPUTER ASSISTED DIALECT ADAPTATION

Computer assisted dialect adaptation (CADA) attempts to exploit the systematic relationships between closely-related languages to produce drafts of text in target languages from source language texts. (Initial explorations are described in Weber and Mann 1979.) CADA works over non-trivial degrees of language difference because, between closely-related languages, most of the differences are systematic. These result from the generalization of regular diachronic changes, thus impacting the language heavily. By contrast, irregular or idiosyncratic changes cannot be generalized, so tend to have a limited impact. So between closely related languages, systematic differences predominate.

Differences are systematic only relative to some analysis. For example, between one dialect of Quechua and another, the character string ra might correspond to ra, ri, ru or rqu, but the context in which each is appropriate cannot be determined simply by inspecting adjacent character strings (in the source dialect text). However, if one can determine the identity of the morpheme in which ra occurs, the differences become systematic: when it is the past tense suffix, then it corresponds to rqa; when it is the punctual, it corresponds to ri or ra, depending on morphological context; when it is the directional 'out', it corresponds to rqu or rqa, and so forth.

Experience in various language families [Quechua, Tucanoan, Cakchiquel (Mayan), Campa (Arawakan), and the Philippine type] has shown that, for language families with rich morphologies, parsing words into morphemes makes most differences systematic, thereby providing a sufficient analytic base on which to do adaptation.

CADA's analytic engine began as a Quechua-specific morphological parser written in INTERLISP (Weber and Mann 1979). This parser was re-implemented in C for small systems (Kasper and Weber 1986a,b). This implementation was subsequently adapted to the Tucanoan language family of Colombia (Reed 1986, 1987), to Campa languages (Arawakan of Peru), and to Philippine languages. Guided by these extensions, a general morphological parser has been developed, called AMPLE (Weber, Black and McConnel 1988).

AMPLE fits into word-by-word adaptation as indicated in Table 1:

```
                              +----------------------------+ S
                              | +----------+               | T
     word analyses-->         | | TRANSFER |-->modified    | A
            ^                 | +----------+ word analyses | M
A +-------------+             +-------------+     |        | P
M | +---------+ |                           | +---v-----+  |
P | |         | |                           | |         |  |
L | | ANALYSIS| |                           | |SYNTHESIS|  |
E | |         | |                           | |         |  |
  | +---------+ |                           | +---------+  |
  |  normalized |                           |  normalized  |
  |    words    |                           |    words     |
  | +---------+ |                           | +---------+  |
  | |  TEXTIN | |                           | | TEXTOUT |  |
  | +---------+ |                           | +---------+  |
  +-------------+                           +--------------+
         ^                                         |
                                                   v
source dialect text                        target dialect text
```

Table 1: The major modules of word-level CADA

The following illustrates how each module of Table 1 contributes to adapting from Pachitea Quechua *Aywarkaykargan* 'they were going' to the corresponding Huanca Quechua form, *Liyalkala*:

```
               Pachitea: Aywarkaykargan
TEXTIN                   |          |
                         aywarkaykarqan
ANALYSIS
               aywa-  -rka     -yka    -rqa  -n
              *aywa-  -PLIMPF  -IMPF   -PST  -3
               |          \    /        |     |
               |           \  /         |     |
TRANSFER       |            X           |     0
               |           /  \         |
               |          /    \        |
              *ri-    -IMPF    -PLIMPF -PST
SYNTHESIS      |        |         |      |
               li     -ya       -lka   -la

                         liyalkala
TEXTOUT                  |
                 Huanca: Liyalkala
```

In addition to serving as the analytic base for adaptation, AMPLE has been used to automate the glossing of texts (see, e.g., Weber 1987a), to detect spelling errors, and perhaps most significantly, to advance users' understanding of the morphology of various languages.

3 GENERAL AMPLE DESCRIPTION

Various external factors have shaped AMPLE: its constructs, mechanisms and notations must be familiar to linguists; its data files should be useful for other computational and non-computational purposes; it must run effectively on personal computers with small memories; and crucially, it must be able to cope with very diverse phenomena without unduly compromising linguistic integrity.

AMPLE takes text as input. It identifies words and normalizes them according to user-specified rules (e.g., change *b* to *p* before *m*). This allows the internal representation to differ from the external orthography (which might even be a phonetic representation). Each word is subjected to a depth-first, all paths analysis. The text is output as a database--one record per word--with fields for the (possibly ambiguous) analysis, punctuation, white space, format marking, and capitalization information.

AMPLE has various "biases." It is based on the assumption that morphemes exist. It applies directly to concatenative morphology; non-concatenative phenomena usually have to be coerced into concatenative solutions. For example, *took* could be analyzed as *take+PAST* (as suggested by Block 1947). To apply AMPLE to fusional languages generally requires large numbers of fused combinations constrained by declension or conjugation class. Finally, AMPLE takes an item/arrangement rather than an item/process approach (Hockett 1954). There are no "underlying forms" from which surface forms are derived.

AMPLE has the following main modules: SETUP, TEXTIN and ANALYSIS.

SETUP reads files containing information about the language, creating internal structures for TEXTIN and ANALYSIS. Most significantly, SETUP reads one or more dictionaries, creating a trie structure based on allomorphs (character strings) for accessing the information about that allomorph and the morpheme it represents.

TEXTIN identifies the words of the text, putting to one side white space, capitalization information, format markup, and punctuation. User-specified orthographic changes are applied, allowing the internal working representation to differ from the practical orthography of the text.

ANALYSIS parses by (i) discovering all possible sequences of matching allomorphs and (ii) filtering these with the tests that the user writes in various linguistically-oriented constraint languages (as described below). This proceeds bottom-up, left-to-right and exhaustively, i.e., all possible combinations of matching morphemes are discovered, and all which pass the tests are returned in the output. Matching and filtering are integrated so as to abandon false paths as early as possible.

There are two types of tests. *Successor* tests apply when a matching allomorph is considered as the next possible morpheme of an analysis. *Final* tests, generally incorporating non-local dependencies, are deferred until an entire decomposition is discovered, one which passes all successor tests.

More specifically, as processing proceeds, a partial analysis is maintained. Whenever a matching allomorph is discovered, successor tests are applied between the partial analysis (usually its last morpheme) and the morpheme under consideration as a successor (for which some allomorph has been matched). For example, in analyzing *rikaykaamaran* 'he was watching me', the following stage would be reached:

```
                    see    IMPFV
                     |       |
  PARTIAL ANALYSIS: rika-  -yka:
POSSIBLE SUCCESSOR:               -ma 1OBJ
  REMAINING STRING: maran
```

One of the successor tests, to take an example, insures that vocalic length (represented here as a colon) is not followed by a syllable-closing suffix (since long vowels cannot occur in a closed syllable).

Successor tests have the advantage of eliminating false paths before they consume more computation, but they can not appeal to following morphemes, since these have not yet been identified. But final tests apply constraints to an entire analysis, so can express forward-referring constraints. For example, a final test might say that a morphophonemically affected unit must be followed (not necessarily adjacently) by a trigger for the process. Also, final tests can impose well-formedness constraints expressed on a particular morpheme; e.g. it might constrain the category of the final morpheme.

4 PHENOMENA

AMPLE can handle a wide variety of phenomena. Units may be prefixes, roots or suffixes; realized, null, or the reduplication of an adjacent segment. Morphemes may have multiple allomorphs. AMPLE can handle the reduplication of adjacent segments (although the mechanism may be clumsy in some cases, as discussed below). Infixation is handled, even when obscured by prior or subsequent affixation or reduplication. The compounding of roots is handled (but nothing has been done to treat the compounding of morphologically-complex words).

4.1 Types of units

AMPLE can deal with roots, suffixes and prefixes (of course!). More interestingly, it can deal with infixes, such as those of Philippine languages, for which an infix may be within a root or within a prefix, and where reduplication may apply after infixation. AMPLE allows compound roots, possibly constrained by the categories of those roots.

AMPLE allows null allomorphs. The occurrence of nulls must be strongly constrained, since they are not constrained by the characters of the word being analyzed. For example, in Napo Quichua, the agentive nominalizer has no phonological realization, due to its lenition and ultimate loss. But there is a strong constraint on its occurrence: it must be at a boundary where an uninflected verb is either word final or followed by suffixes typical of nouns. When adapting to Pastaza Quichua, where the agentive is /h/, it is thus possible to insert /h/ in the appropriate places with considerable accuracy. (For example, rita (= ri- 'go' -0 'agentive' -ta 'accusative', meaning 'to the one who goes') can become ri-j-ta.

4.2 Phonologically conditioned allomorphy

The occurrence of each allomorph in an analysis may be constrained by its phonological or morphemic environment, either locally or at a distance.

4.2.1 Issues of representation

The practical orthography of the text being analyzed may not be the best representation for doing analysis. (For example, in analyzing Spanish, it might be desirable to eliminate the orthographic alternation between *z* and *c* (cf. raiz, raices). Likewise, for Latin one might wish to convert *x* into *ks*, so that a morpheme boundary could be posited between the *k* and the *s* (cf. rex = /reks/, regis). Orthographic changes such as these can be made by the TEXTIN module.

4.2.2 Conditions on allomorphs

Allomorphs may be restricted by phonological (character string) environment. For example, the following says that m may only occur followed by p. (\a is the field code for "allomorph".)

```
\a m / _ p
```

Classes of phonological segments can be defined, and then used in constraining environments. For example, the following defines the class of labials and states that *m* must precede one of them:

```
\scl +labial p b f v
\a m / _ [+labial]
```

4.2.3 Multiple allomorphs

Any morpheme may have multiple allomorphs. For example, the second person possessive in most Quechua languages has three allomorphs, constrained as follows (where ~[V] _ indicates "not following a vowel):

```
\a niki / ~[V] _  | hatunniki 'your big one'
\a ki   /    i _  | wasiki    'your house'
\a yki  /  [V] _  | umayki    'your head'
```

Reduplication is handled as a special case of multiple allomorphs, where each possibility is enumerated along with the environment in which it could occur (so, e.g., pa before pa..., pe before pe, etc.). If the reduplicated form is always a precise substring of what precedes or follows, it is possible to state this as a general constraint rather than with each allomorph.

4.3 Morphophonemics

Phenomena involving both altered form (phonology) and morpheme identity present no special challenge because both the character string being analyzed and the posited morphemes are available.

4.3.1 Morpheme environment constraints on allomorphs

It is possible to restrict the occurrence of an allomorph by the identity of a morpheme; e.g., the following says that an must be directly followed by the morpheme identified as PQR:

```
\a an +/ _ PQR
```

4.3.2 Properties and tests

It is possible to assign properties to allomorphs and morphemes and to use these in a very general constraint language. For example, suppose inherently applicative verbs may never co-occur with the applicative suffix APPL; this can be incorporated by assigning the property "applicative" to these verbs and imposing the following test:

```
IF   (current property is applicative)
THEN (FOR_ALL_RIGHT
      NOT (RIGHT morphname is APPL))
```

4.4 Morphotactics

AMPLE has good mechanisms for imposing morphotactic constraints. There are three main types: categorial, ordering, and morpheme co-occurrence constraints.

4.4.1 Categorial constraints

Roots are assigned one or more categories, and affixes are assigned one or more category pairs. The left part of a category pair is called the "fromcategory" and corresponds roughly to the affix's "subcategorization frame." The right part is called the "tocategory" and corresponds roughly to its "category".)

In terms of these categories, tests can be imposed which "structure" the verb. To illustrate, consider a language with derivational suffixes (causative, applicative, passive, etc.) and inflectional prefixes. What inflection is permitted and/or required depends on the category after derivation, and "prior" inflection. Likewise, the derivational possibilities depend on the category of the root and any "prior" derivation. Thus, the constraints must propagate first progressively from the root through the suffixes and then regressively through the prefixes to the beginning of the word:

```
         S
         /\
        /  U
       /   /\
      /   /  Z
     /   /   /\
    /   /   X  \
   /   /   /\   \
  /   /   /  \   \
R/S T/U  V   W/X Y/Z
pfx pfx root sfx sfx
```

This can be achieved by four tests:

(i) for suffixes (whereby V=W and X=Y above):

left tocategory is current fromcategory

(ii) for prefixes (whereby U=R above):

current tocategory is left fromcategory

(iii) to identify the category after derivation with that of the closest prefix (Z=T above):

IF (current type is prefix AND right type is root)
THEN (current fromcategory is FINAL tocategory)

(iv) to ensure that the category of the whole word (S above) is an acceptable terminal category, we can declare a class of such categories (called "finalcategories") and state:

```
     INITIAL tocategory is member finalcategories
```

Thus, although AMPLE processes from left to right, it is possible to model the percolation of features from a root through the layers of affixation, to the final resulting category of the word.

4.4.2 Ordering

The use of category along the lines described in the previous section may strongly restrict the order in which affixes occur. However, further ordering constraints may need to be imposed. This can be done by giving each affix a number (not necessarily unique) and imposing a successor test like the following:

```
     left orderclass < current orderclass
```

This says that every morpheme's number must be greater than that of the preceding morpheme, so insists that the orderclass strictly increase. If "<=" were used instead of "<", the order would be non-decreasing.

The test could also be modified to tolerate morphemes that are not constrained by order, such as Quechua *-lla* 'just'. To do so, we assign *-lla* orderclass 0, and then the following successor test passes it:

```
        (current orderclass = 0)
     OR (left orderclass <= current orderclass)
```

To make ordering constraints apply over one or more "floating" affixes, we give the following final test:

```
     IF (    (current orderclass = 0)
         AND (FOR_SOME_LEFT  (LEFT  orderclass ~= 0))
         AND (FOR_SOME_RIGHT (RIGHT orderclass ~= 0)))
     THEN (LEFT orderclass <= RIGHT orderclass)
```

4.4.3 Morpheme co-occurrence constraints

AMPLE has a simple but effective constraint language for imposing conditions on the co-occurrence of morphemes. The following, for example, says that PLIMPF can only occur preceding IMPFV:

```
     \mcc   PLIMPF  / _ IMPFV
```

The following says that the conditional morpheme CND must be preceded (not necessarily contiguously) by a first, second, or third verbal person suffix (respectively named 1, 2, and 3):

```
     \mcc CND / 1 ..._ / 2 ..._ / 3 ..._
```

The first line of the following defines a class of morphemes DIR, and the second says that PLDIR must precede a directional, the reciprocal or the reflexive:

```
\mcl DIR   IN OUT UP DWN
\mcc PLDIR / [DIR] _ / RECIP _ / REF _
```

5 AMPLE AS A TOOL FOR LINGUISTIC EXPLORATION

AMPLE has some features that enhance its usefulness as an exploratory tool:

1. It returns the original word (the \a field), that word's decomposition (\d), and the analysis (\a); for example, the following would be returned for *rirkansapanashi* 'they now went (it is reported)':

   ```
   \a < V1 go > PST 3 PLUR NOW REPORT
   \d ri-rka-n-sapa-na-shi
   \w rirkansapanashi
   ```

2. AMPLE reports all analytic failures, indicating how far into the word it was able to proceed and whether or not it matched a root. This often provides a sufficient clue to why the word failed to be analyzed. For example, the following report (for Quechua) makes it clear that (i) the root *fes* (*hwes* after orthography changes) is not available as a root, and (ii) there is an incompatibility between the suffixes *-ri* and *-ma*::

   ```
       Root Failure: hwesqa  [ ¦ fesqa ]
   Analysis Failure: roqorimaachun  [ roqori ¦ ma:chun ]
   ```

3. AMPLE reports on the effectiveness of each test: for both the user-defined and built-in tests, it reports how many times each test was applied (in the order of application) and how many analyses were filtered out by the test:

   ```
      CATEGORY_ST called 10936 times, failed 7436.
         ORDER_ST called  3500 times, failed 392.
   FORESHORTEN_ST called  3108 times, failed 36.
       MLOWERS_ST called  3072 times, failed 2.
   ```

4. The user can control which tests are applied and the order of their application. This makes it possible to see the effectiveness of each, and their joint effect.

5. Ambiguity levels are reported as follows:

```
  2 words with  0 analyses.
620 words with  1 analysis.
 73 words with  2 analyses.
  2 words with  3 analyses.
  3 words with  4 analyses.
```

6. It is possible to trace AMPLE's parsing activity. For example, the following is the first part of the trace for the Quechua word nimaran:

```
Parsing nimaran
root: ni, *ni V2
sfx: ma, 1O, V2/V1, order: 70, ullong Mlowers, fshrtnd
  sfx: ra, PST, V1/V1, order: 80, foreshortens
    sfx: n, 3P, N0/N0, order: 140   / [V] _
            Suffix test CATEGORY_ST failed.
    sfx: n, 3P, R1/R0, order: 140   / [V] _
            Suffix test CATEGORY_ST failed.
    sfx: n, 3P, N1/N0, order: 140   / [V] _
            Suffix test CATEGORY_ST failed.
    sfx: n, 3, V1/V0, order: 120, foreshortens
            No more suffixes found.
            End of word found; checking final tests
                 Analysis string: < V2 *ni > 1O PST 3
                 Decomposition:   ni-ma-ra-n
```

   After achieving this analysis, AMPLE continues considering other possibilities.

A future version of AMPLE will allow selectivity in tracing, more information in the analysis (e.g., the category pairs used in an analysis), and quantifying the contribution of specific morphemes, tests, etc. to analysis.

6 CONCLUDING REFLECTIONS

AMPLE's match-and-filter algorithm permits a highly modular approach to morphological parsing. Strong rejection of incorrect analyses can be achieved by the combined effect of diverse filters, each of which may be quite simple. Direct reporting of these linguistic constraints is possible because they are not compiled into some inaccessible form. And this algorithm has proven to be reasonably efficient.

Our success with the match-and-filter algorithm suggests that morphology has a modular organization. That is, the organization of morphology may resemble the Chomskian approach to syntax, where diverse principles or theories, here expressed as filters, jointly but modularly define acceptability.

Each filter is expressed simply in a notation appropriate to the phenomena and familiar to the users, in this case linguists. This makes it quite straight-forward for linguists to set up a morphological parser for a language. Experience has repeatedly shown that doing so leads the user to new insights into the morphology. Because there are various constraint languages and mechanisms, AMPLE can be used to model various conceptions of the morphology, and to quickly test these against large amounts of data.

The modularity afforded by the match-and-filter approach also makes AMPLE very extensible: as other constraint languages are discovered (and notations developed) they can be integrated into AMPLE. For example, we are considering an alternative (or complement) to the category system that would allow categories to be defined as sets of features, incorporating percolation, redundancy rules and feature addition rules; see Weber 1987b.

We expect AMPLE to be useful in conjunction with various syntactic parsers. In one experiment, a unification-based parser (adapted from an early version of PATR-II) parses sentences (or sentence fragments) using AMPLE output. The morpheme dictionaries are read once by AMPLE for the morphological information and again by the syntactic parser for the syntactic parser.

We hope that in the next few years AMPLE will be applied to a much wider range of languages.

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